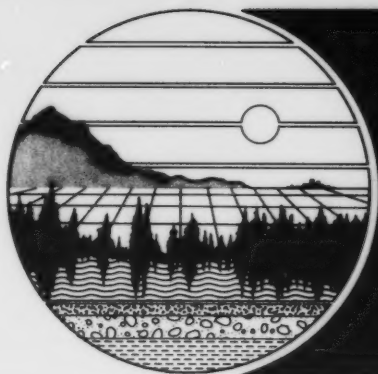




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**COMPARATIVE DRAINAGE BASIN PLANIMETRY :
NATIONAL AND REGIONAL
SCALE APPLICATIONS**

DISCUSSION PAPER NO. 4

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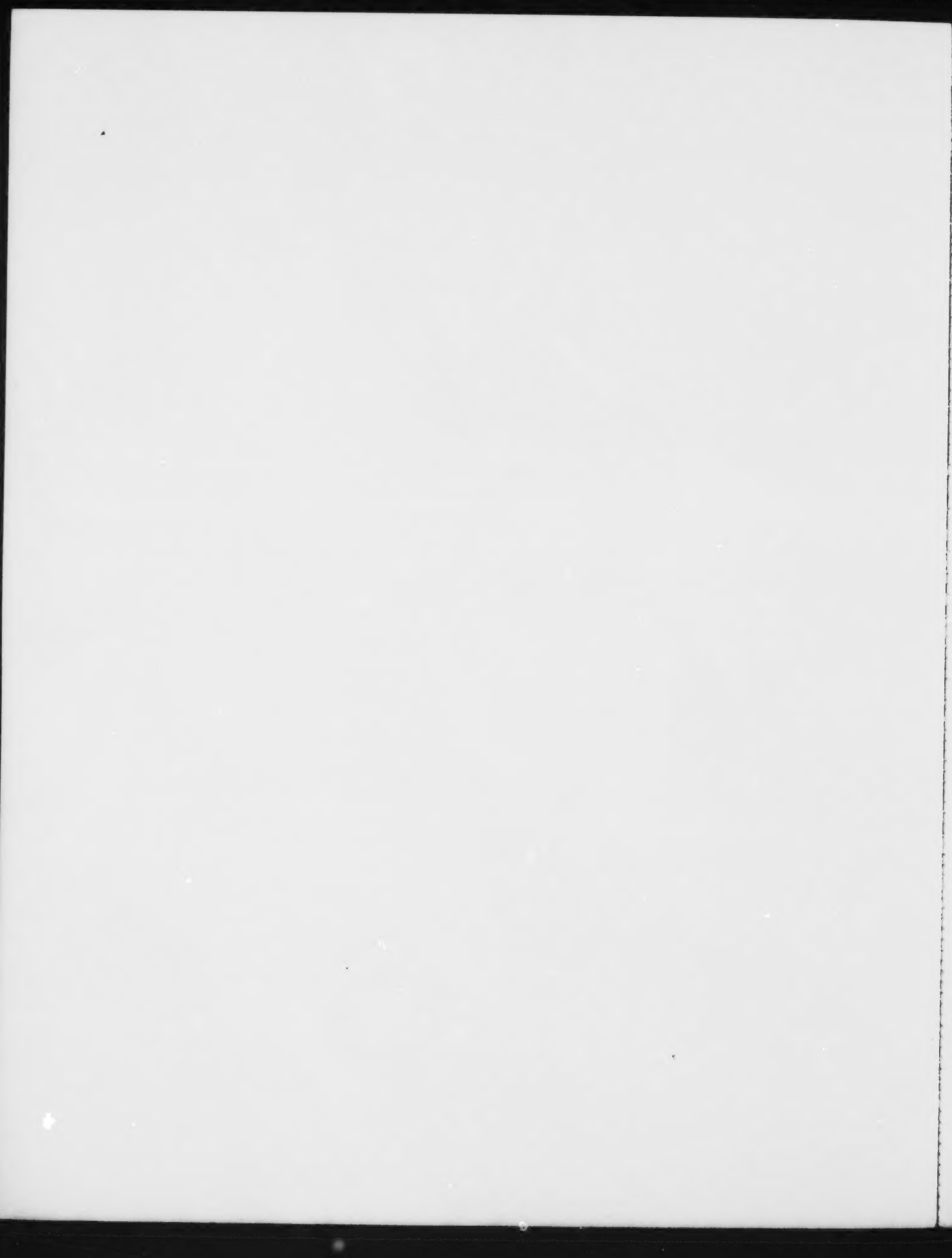
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**COMPARATIVE DRAINAGE BASIN PLANIMETRY:
NATIONAL AND REGIONAL SCALE APPLICATIONS**

By:

ROBERT G. HÉLIE

1989

DISCUSSION PAPER NO. 4

**Ecological Application Research Division
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1.0 INTRODUCTION

1.1 Background

Much research has been directed to better understand the processes involved in lake water acidification. Models have been developed to study the trends associated with lake acidification from anthropogenic acid deposition (Henriksen, 1980; Chen et al, 1983; Wright, 1983; Christophersen et al, 1982; Cosby et al, 1985). Modeling efforts to characterize the physical and chemical effects of atmospheric water upon surface waters have also proved helpful in attaining an understanding of land/water relationships and dynamics. (Reuss et al, 1986).

Models can be grouped into two broad categories: site models and regional models. The main difference between the two categories resides in the scale of application. Each model scale category, in turn, can be subdivided into two types: predictive models and descriptive models. As indicated by their name, predictive models are designed to predict water quality according to different atmosphere acidity loading scenarios. Descriptive (mechanistic) models are designed to understand the interactions between key parameters within the drainage basin.

Predictions on chemistry are primarily based on how "water sinks", such as lakes and ponds are affected by the inherent attributes of the surrounding drainage basin and by the deposition of atmospheric pollutants. Beyond the raw lake chemistry data, there is a need to understand the processes taking place within the surrounding drainage basin and which affect water chemistry.

In the absence of direct chemistry data within lakes per se, as in the case for large regions of eastern Canada, water chemistry is often estimated. Since there is close interaction between lake chemistry and the surrounding drainage basin, Terrestrial factors are used as surrogates for missing water chemistry data. Important among these is the land water ratio, which determines the relative magnitude or degree of influence of the drainage basin on lake chemistry.

Terrestrial parameters have been used as an integral part of the modeling and monitoring. Enricksen (1980) used terrestrial parameters to quantify the interplay between terrestrial and aquatic ecosystems in Scandinavia. In Canada, terrestrial parameters, including land/water ratios are taken into consideration in the eastern Canada LRTAP (Long Range Transport of Airborne Pollutants) monitoring networks (Howell, 1986, Haemmerli, 1986) as well as in the Federal LRTAP calibrated drainage basins. Land/water ratios are also an essential component of more regional studies (Hélie and Fraser, 1987).

1.2 Purpose and Scope

Up to now, no comprehensive source of information relative to drainage basin planimetry in Canada has been available. Such information is important for a variety of water-related applications. In this case, drainage basin planimetry is essential to regional modeling efforts and to the assessment of surface water resources at risk due to acidification. Drainage basin planimetry provides the basic framework within which further, more detailed studies can be carried out.

There are three central sections in this report. Section 2.0 provides a generalized overview of drainage basins throughout Canada, in terms of their area and relative water content. In Section 3.0, the emphasis is placed on a more detailed Eastern Canada perspective. Section 4.0 documents the initial evaluation of the water resource at risk due to acidification within 3rd order drainage basins in southeastern Quebec.

1.3 Terminology

1.3.1 Drainage Basin Nomenclature

A drainage basin refers to natural divisions of the earth surface which act as a collecting surface for precipitation. These spatial divisions can be hierarchical. The Water Survey of Canada (Fisheries and Environment Canada, 1977) uses a hierarchy comprised of main divisions, subdivisions, and sub-subdivisions; these can be equated with primary, secondary, and tertiary order drainage basins, respectively.

When discussing drainage basin planimetry, a distinction exists between accuracy and precision. Accuracy is a measure of how close a value is to the absolute truth. Precision refers to the measurement method, i.e. a two, three or four decimal precision. A precise measurement is not necessarily accurate. This concept is important when discussing data bases which have been compiled different scales, such as those described below. Although each data base provides the same measurement precision (i.e. 0.01 ha), the scale difference yields different accuracies.

1.3.2 Data Bases

Three distinct data bases have been used for this study: Land Cover, CDR Model and CDR Sub. Each data base is listed below in increasing order of scale, and is described as to its nature and purpose. The last (fourth) item pertains to the shoreline overlay, used in several data bases.

Land Cover: This data base, at a scale of 1:2 million, encompasses all of Canada. It is comprised of several overlays, three of which are used in this study: shoreline, drainage basin, and ecodistricts. The latter two were used originally to determine the land cover associations for Canada, hence the name.

CDR Model: This data base covers most of eastern Canada (Fig. 6). It depicts drainage basins, ecodistricts, and shoreline at a scale of 1:1 million. Thus, one can obtain a higher level of accuracy for drainage basin planimetry, especially in relation to the water area within a drainage basin. This data base was constructed as a basis for the spatial framework related to regional surface water acidification modeling. The data base takes its name from the first model tested: The Cation Denunation Rate (CDR) Model, developed by Thompson (1985).

CDR Sub:

This is a subset of the CDR Model data base, corresponding to southeastern Quebec (Figure 6). Although generated at the same scale as the CDR Model data base, the CDR sub data base was modified to include a detailed lake point file for that portion of the province, in addition to the basic shoreline coverage (see below).

Basic Shoreline:

One component common to each of the above data bases is shoreline. The shoreline is an overlay which depicts the water (lakes and rivers) on both the CDR Model and CDR sub data bases. It is borrowed from the Canada Land Inventory (CLI) data base and is sometimes referred to as the CLI shoreline coverage. It provides first order water planimetry statistics, as well as realistic graphic outputs.

2.0 DRAINAGE BASINS IN CANADA

2.1 Introduction

Canada is subdivided into 11 main drainage basins (Figure 1). The separation among these basins is based on the country's principal drainage divides, which determine the flow direction of surface waters. Each main basin is subdivided into 160 smaller subdivisions (Figure 2), each of which is further subdivided into small units termed sub-subdivisions totalling 927 across Canada.

2.2 Methods

Planimetry for the drainage basins is obtained through a Geographical Information System (GIS). First, the drainage basin lines are plotted on a stable base for each UTM zone in Canada. These lines are digitized using an optical drum scanner. The resulting drainage basin coverage is then incorporated to the National Land Cover data base, at a scale of 1:2,000,000 comprised of shoreline, ecodistrict (Rubec and Wiken, 1983) and census division overlays. The drainage basin and shoreline overlays were used in combination to produce planimetric statistics (Figure 3).

2.3 Results

Once the shoreline and drainage basin overlays are combined, planimetric information can be computed. For each drainage basin sub-subdivision, an area value for total land and total water is calculated. The sum of these values provides the total area of each drainage basin sub-subdivision. Planimetric statistics for each drainage basin sub-subdivision can also be grouped into the corresponding drainage basin subdivision to provide planimetry statistics at that level. The same process is applied at the main drainage basin division level. The three levels of drainage basin planimetry statistics are presented in Appendix 1.

The national drainage basin coverage is presented in two formats. Firstly, area values are given for each drainage basin, regardless of the province it occupies. Thus, each discrete drainage basin is measured according to the

FIGURE 1: Map of main drainage divisions for Canada.

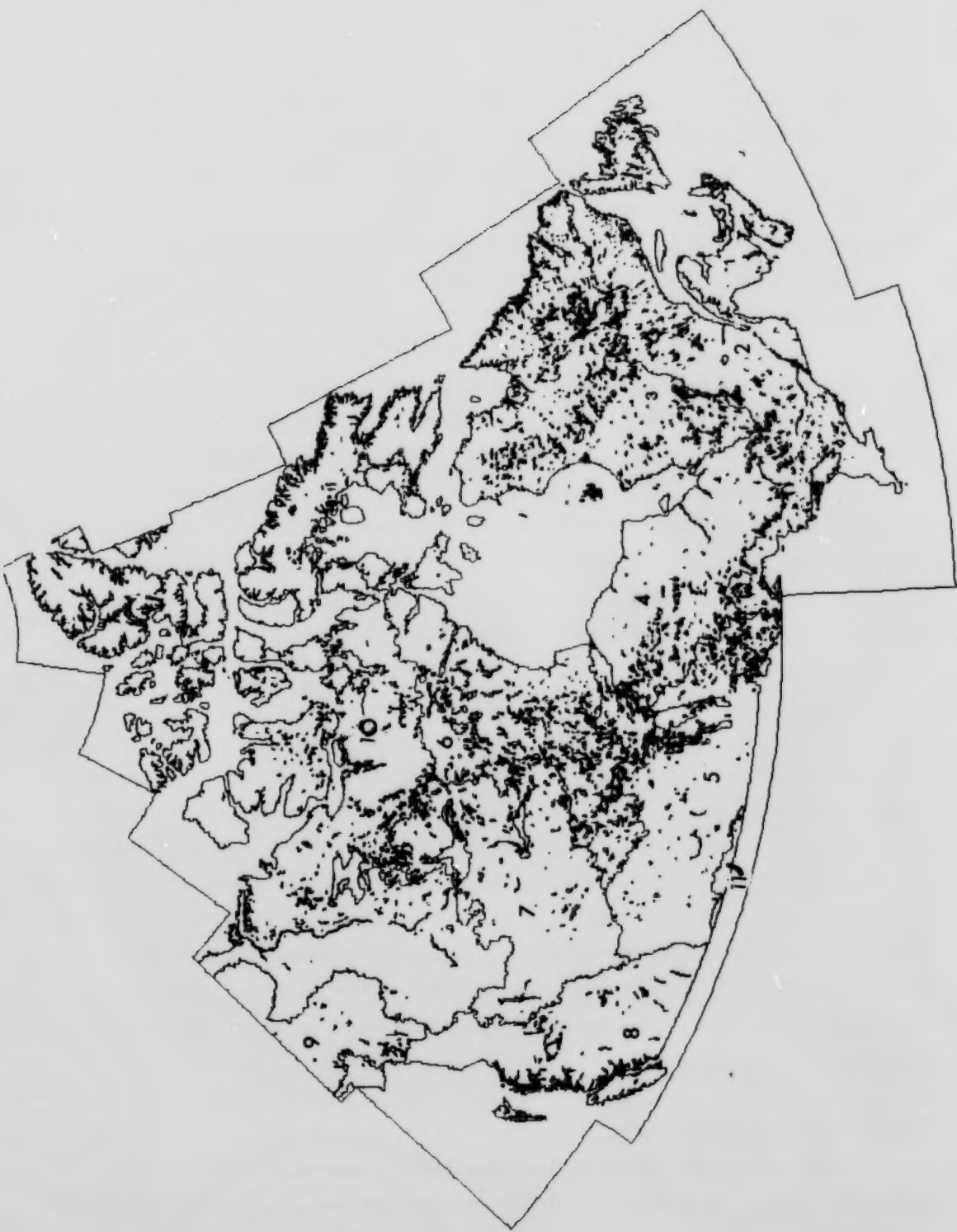


FIGURE 2: Map of drainage basin subdivisions for Canada.





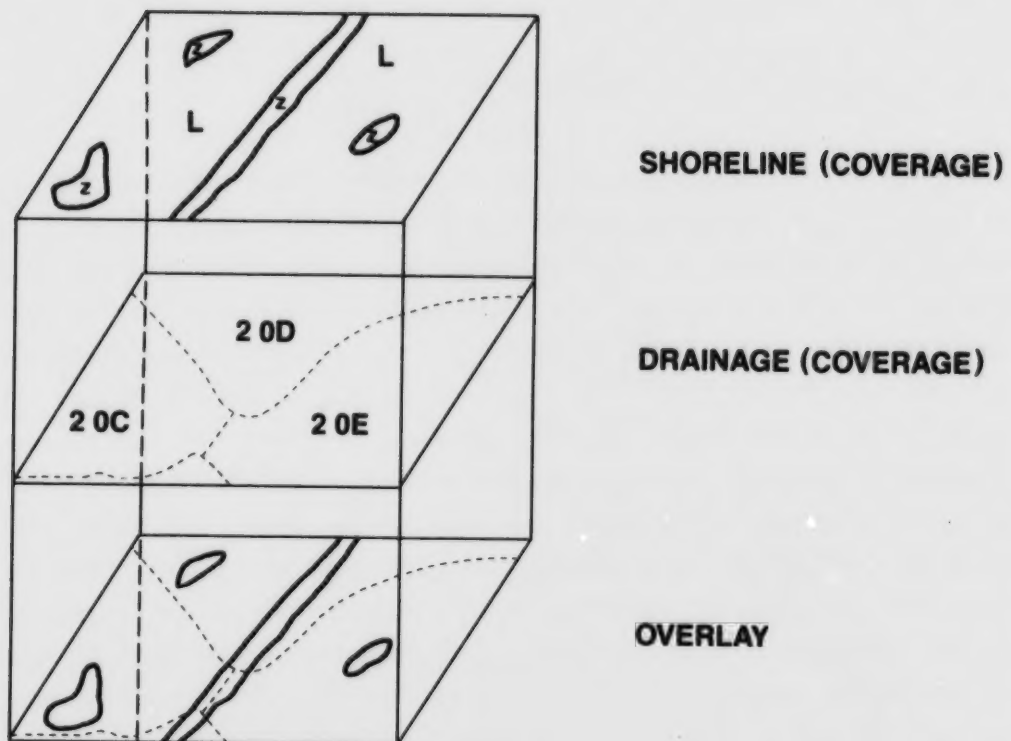


FIGURE 3: Schematic view of the shoreline and drainage basin overlay process.

drainage basin framework (Appendix 1). The second area calculation is based upon political boundaries. In this format, only the portion of the drainage basin within a given province is measured. For drainage basins which cross provincial boundaries, the area specific to one or the other province may easily be obtained, and provincial compilation of drainage basin areas can be made. The list of drainage basins for each province appears in Appendix 2.

2.4 Discussion

The areas listed in Appendices 1 and 2 provide a first order approximation for drainage basins throughout Canada (scale = 1:2,000,000). Ratios of land to water can be obtained at this scale, but results must be interpreted within the following scale restrictions: the maximum lake resolution is between 315 and 400 ha for water bodies approaching a circle or a square (respectively) in outline (see Table 1) assuming a minimum digitizing area to be 1x1 millimetre. Because the shoreline and the drainage basin boundary must not coincide (system limitation), the drainage basin boundary is arbitrarily drawn into the water for drainage basins which are adjacent to large fresh water bodies (lake or river) (Figure 4), thus exaggerating the total water area. The water component for these drainage basins will consequently be overestimated. Also, for all drainage basins, the total water area is the best estimate possible for a 1:2,000,000 scale. Thus, lakes smaller than 315 ha are not considered in the planimetry. The resultant error is greater in areas where small lakes are numerous, such as in the Canadian shield and on several of the arctic islands.

As stated above, the areas listed in Appendices 1 and 2 provide a first order approximation for drainage basins area (in hectares) throughout Canada at a reconnaissance scale (1:2,000,000). In the next section, a larger scale is used for more area-specific studies. This larger scale provides relatively more accurate area calculations for drainage basins where surface water resources at risk assessment is ongoing. These calculations have been carried out for a portion of Eastern Canada.

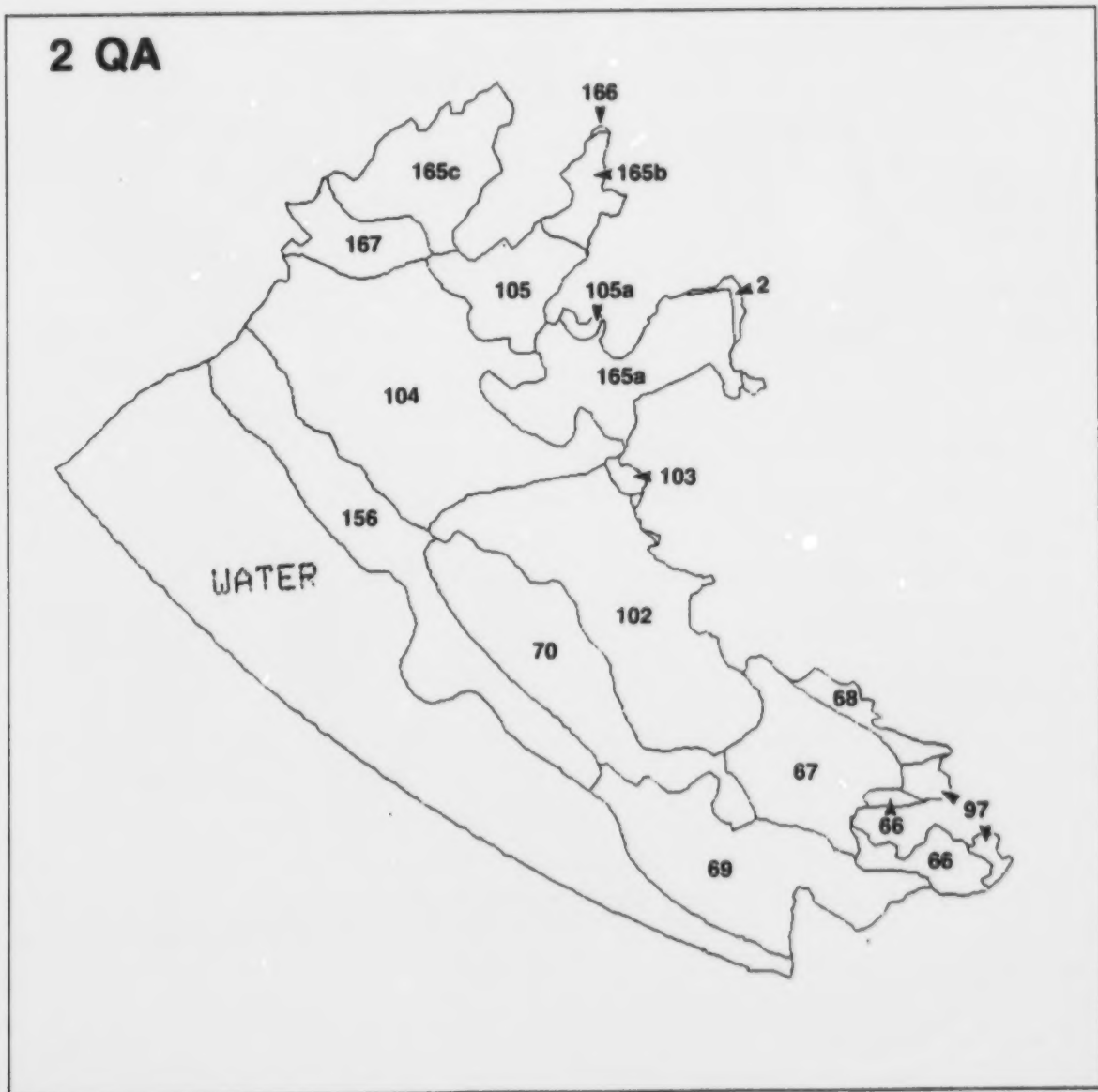
TABLE 1

Maximum Resolution for Water Bodies at Different Map Scales

<u>Data Base</u>	<u>Scale</u>	<u>Resolution (ha)</u>	
		(SQUARE)	(CIRCLE)
National Land Cover	1:2,000,000	400	314.16
Quebec Lakes Point File	1:50,000	0.25	0.20
CDR Model	1:1,000,000	100	78.54
LANDSAT TM	30m x 30m	.09	N/A

Areas are given for lakes of different ideal shape (square or circle) and for specific data bases used for this and related studies.

FIGURE 4: Configuration of a drainage basin sub-subdivision which is adjacent to a large freshwater body. Note the exaggeration of the water component into the larger water body.



3.0 SURFACE WATER PLANIMETRY IN EASTERN CANADA

3.1 Introduction

Regional acidification modeling often requires planimetric information if the terrestrial ecosystem is to be taken into account. Although basic planimetry data, such as land/water ratio, is available through the national data base (preceding section), the accuracy is not sufficient for regional modeling purposes.

Regional acidification models have been developed to assess the potential surface water resources at risk from acidification. Many of these are sensitive to land/water planimetry and are based both on water quality and on terrestrial ecological characteristics. One such model, known as the CDR (Cation Denudation Rate) model, was applied within a drainage basin framework. The methodology developed to integrate detailed planimetric information is described by H  lie and Fraser (1987).

3.2 Methods

The geographic framework necessary for planimetry computations requires GIS technologies. A data base, named "CDR model" after the acidification model it was to support, was generated on the Canada Geographic Information System (CGIS) mainframe GIS (Figure 6). It is comprised of three distinct coverages:

1. Basic shoreline
2. Landscape ecodistricts
3. Drainage basin sub-subdivisions

Through an automated overlay process, which is described in detail in H  lie and Fraser (1987), the three coverages (shoreline, ecodistricts, and drainage basin) were integrated into a format that allowed analysis of terrestrial and aquatic information from both a planimetric and ecological perspectives (Figure 5).

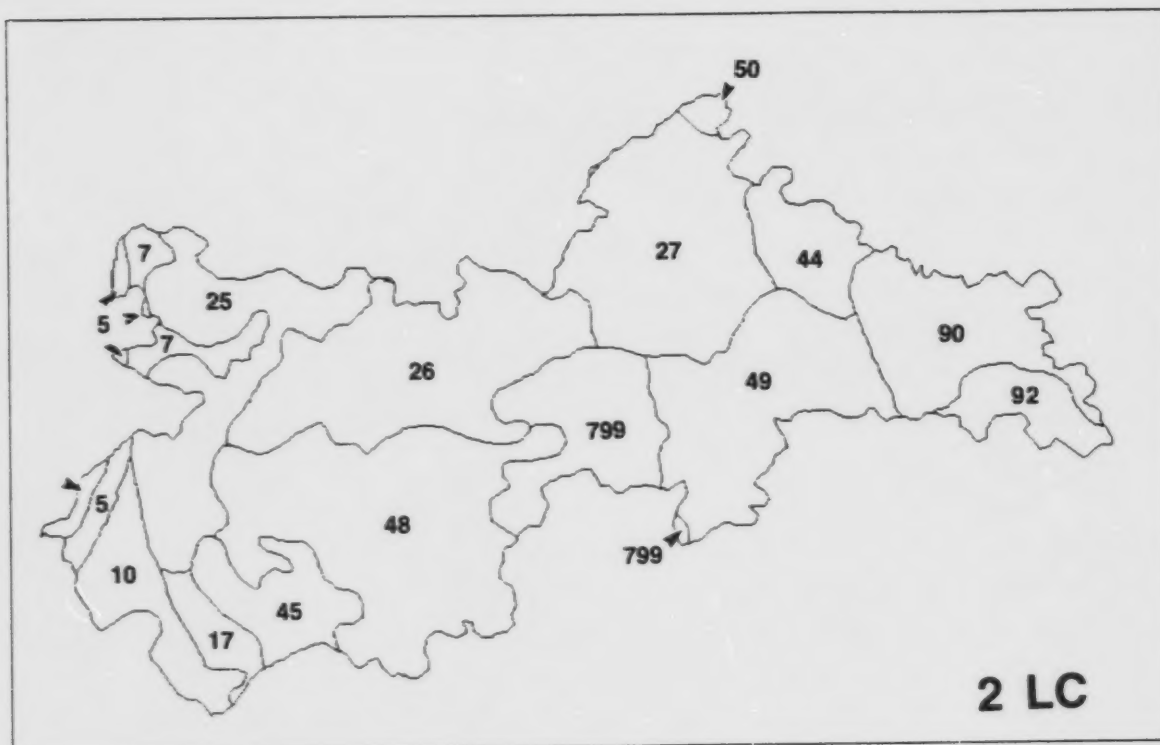


FIGURE 5: Schematic view of the overlay process, including the Ecodistrict coverage. This application of GIS technologies illustrates the link created between terrestrial and aquatic frameworks.

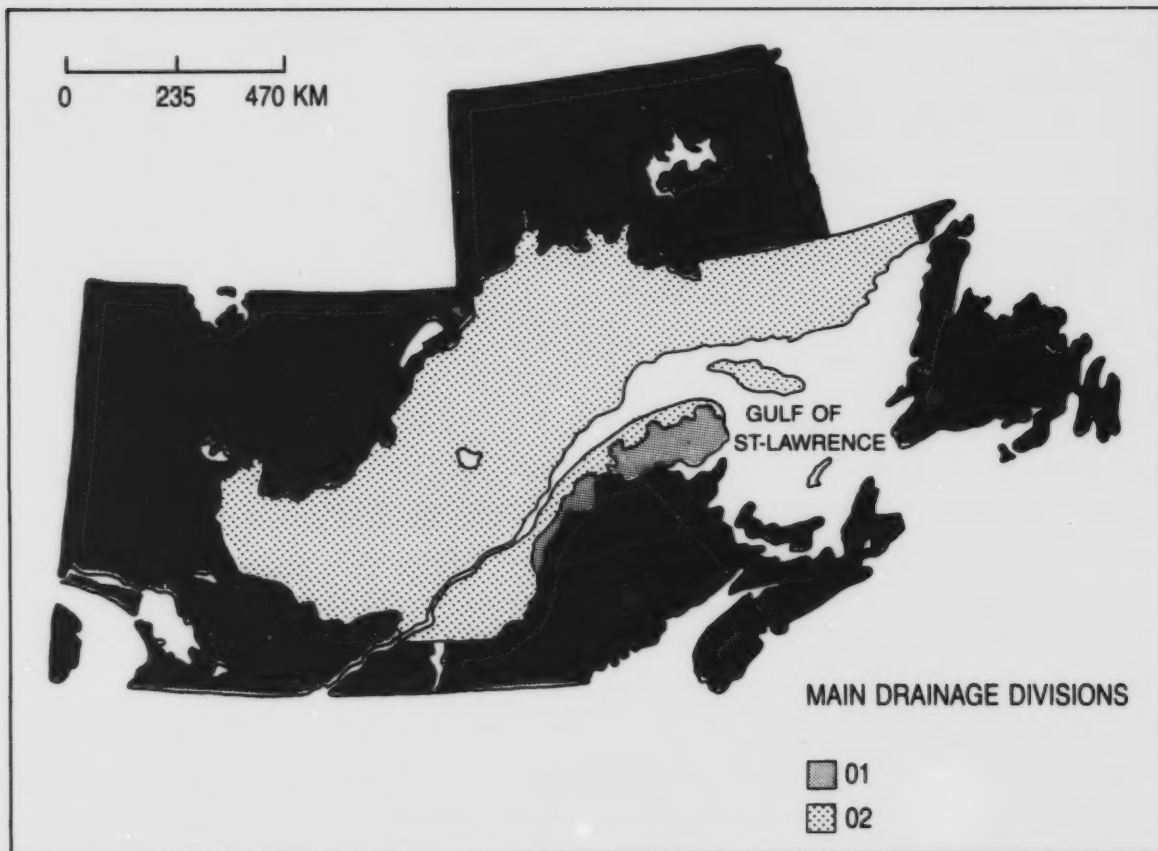


FIGURE 6: Area configuration of the CDR-Model database, showing the CDR-Sub subset defined by the Quebec portion of drainage basin main divisions 1 and 2.

3.3 Results

The CDR model data base covers most of Eastern Canada from the Manitoba-Ontario border to Newfoundland (Figure 6). The data base is comprised of 307 drainage basin sub-subdivisions, representing 49 drainage basins subdivisions. These are distributed among 4 drainage basin main divisions thus: 6 in main division 1; 24 in main division 2; 13 in main division 3; and 6 in main division 4. The areas for land (L) and water (Z) are tabulated in Appendix 3 for each drainage basin sub-subdivision. As for the National data base at 1:2,000,000, water area is arbitrarily exaggerated when the drainage basin is adjacent to, but does not include, a large freshwater body (lake or river) so that care should be taken when using the water values. This is especially true for drainage basins which lie along the St. Lawrence River.

3.4 Discussion

The shoreline coverage in the CDR model data base provides a greater accuracy than the smaller scale national data base. The scale allows for a maximum lake resolution of between 78 and 100 ha (see Table 1): an improvement from the 400 ha limitation of the national data base at 1:2,000,000. Individual lakes, however, cannot be retrieved easily from the data base, so that the actual number of lakes and their area are not computed.

The landscape ecodistrict coverage provides a second geographic framework where terrestrial parameters such as geology, vegetation, and soil are described. The landscape ecodistricts of southeastern Quebec are taken from a larger data set which covers all of the province of Quebec (Gilbert et al, 1985).

The drainage basin coverage used for the CDR model data base is the same as that used for the national data base. The difference is that, for the CDR model data base, the drainage basin coverage was used at its original input scale, ie. 1:1,000,000 instead of a somewhat generalized 1:2,000,000 scale as used in the national version. The difference in drainage planimetry accuracy

is illustrated in Appendix 7. The CDR Model study area contains 281 drainage sub-subdivisions. Many of these, located along the western or northern boundaries of the data base, are truncated so that area calculations are underestimated to varying degrees.



4.0 SOUTHEASTERN QUEBEC CASE STUDY

4.1 Introduction

For the purposes of calibration for a regional surface water acidification model, the water component of the CDR model data base was deemed unsuitable for two reasons. First, the accuracy for water area is as good as the scale of 1:1,000,000 allows: maximum lake resolution of 75 to 100 ha, depending on lake shape (Table 1). Thus, the numerous smaller lakes on the Canadian shield are not considered at this scale. Secondly, since individual lakes cannot be counted, a quantitative assessment of surface water resources at risk (i.e. how many lakes are affected) is not possible. In an attempt to solve this problem, a subset of the CDR model data base, corresponding to the model calibration area, was generated for more detailed analyses.

4.2 Methods

The CDR Sub data base, being a subset of the regional CDR model data base, is also at a scale of 1:1,000,000. It is comprised of the Quebec portion of drainage basin main divisions one and two (Figure 6). This corresponds to 88 drainage basin sub-subdivisions and 439 landscape ecodistricts. In addition to the standard CDR model data base, however, two components were added to the subset: aquatic sensitivity rating for each ecodistrict and a detailed lake inventory.

4.2.1 Aquatic Sensitivity

Based upon standard criteria (Li, 1985; Covell et al, 1980), each of the 439 ecodistricts is rated as to the sensitivity of its aquatic ecosystems to acidification. The methodology involves the use of surrogate indicators such as type of bedrock, texture and thickness of surficial deposits, and the area extent of both. Each ecodistrict is then assigned a qualitative index of its potential to reduce acidity. Thus, in an ecodistrict, where the combination of soil and bedrock characteristics is rated as having a high potential to reduce acidity, the corresponding aquatic ecosystems will have a low sensitivity to acidification (Environment Canada, 1988).

In ecodistricts with more complex terrestrial ecosystems, the potential to reduce acidity is often expressed as an area-weighted combination of high, moderate or low ratings. Also, the presence of organic material (0) is expressed when present. For an example, if five tenths of the area of an ecodistrict is rated as having a high potential to reduce acidity, four tenths are rated as "moderate" and one tenth is dominated by organic terrain, the overall potential to reduce acidity rating for the ecodistrict will be $H_5M_4O_1$. (The area always adds up to ten tenths, or 100% of the ecodistrict total area). When an ecodistrict spans two or more drainage basins, as is often the case in the GIS overlay process, it must be assumed that the rating proportions remain the same in each of the drainage basins. These proportions are then applied to the respective areas of the ecodistrict within each drainage basin.

4.2.2 Lake Inventory

The second addition to the CDR Sub data is a detailed lake file. This lake inventory was compiled by the "Service du milieu hydrique" of Environment Quebec. This provincial data base is comprised of a wide range of information pertaining to individual lakes in southern Quebec. For this study, the geographical coordinates and area for each lake were the only two parameters used. These parameters were compiled originally manually from maps at a scale of 1:50,000, with a maximum lake resolution of approximately 0.25 ha (see Table 1). Also, because the data base was generated originally in British units, conversions to the metric system are averaged. Furthermore, some lakes, although counted, were never measured. To keep track of these peculiarities of the data base, unmeasured lakes and measured lakes below 13 hectares were assigned special codes which in turn, complicated data base manipulations during the overlay process and derivation of counts and measures on an area weighted basis. Table 2 summarizes these peculiarities. In the computations for this report, areas listed as above 0 were computed at face value. Those areas listed as having an area of 0 were computed as having an arbitrary value of 2 hectares, slightly above the upper critical range. This slight overestimate of the area contributes to compensate for underestimates in the other size classes.

TABLE 2

**Lake Codes and Corresponding True Area Ranges
Used in the Quebec Provincial Point File**

AREA CODE	TRUE AREA RANGE (ha)	
9999	NOT MEASURED	
0	0	1.3
3	1.3	3.9
5	3.9	6.5
8	6.5	9.1
10	9.1	11.7
13	11.7	14.2

Source: Jacques Déziel (personal communication), Ministère de l'environnement du Québec

The Provincial lake data base lists 146,609 lakes, distributed among the 13 provincial drainage basins regions (Ministère des richesses naturelles, 1975). Most of these (120,931) are comprised within the CDR Sub study area (within the Quebec portion of drainage basin main division 1 and 2 (Environment Canada, 1977)). These lakes were integrated to the CDR Sub data base as a digital point file through a point-polygon overlay method (Figure 7). By this method, each lake (corresponding to a point defined by geographical coordinates) is matched to the ecodistrict and drainage basin framework (defined as polygons on the GIS). A report can then be generated, listing planimetric information for lakes within an ecodistrict framework, or a drainage basin framework, or both (Figure 8). Results from the point-polygon overlay are listed by drainage basin sub-subdivision in Appendix 4.

4.2.3 Surface Water Resources at Risk

The basic shoreline coverage in the CDR Sub study area is at a scale of 1:1,000,000 and yields generalized information such as land-water ratios. For surface water resources at risk assessment however, the degree of accuracy associated with this scale is not sufficient; also, lake size and area

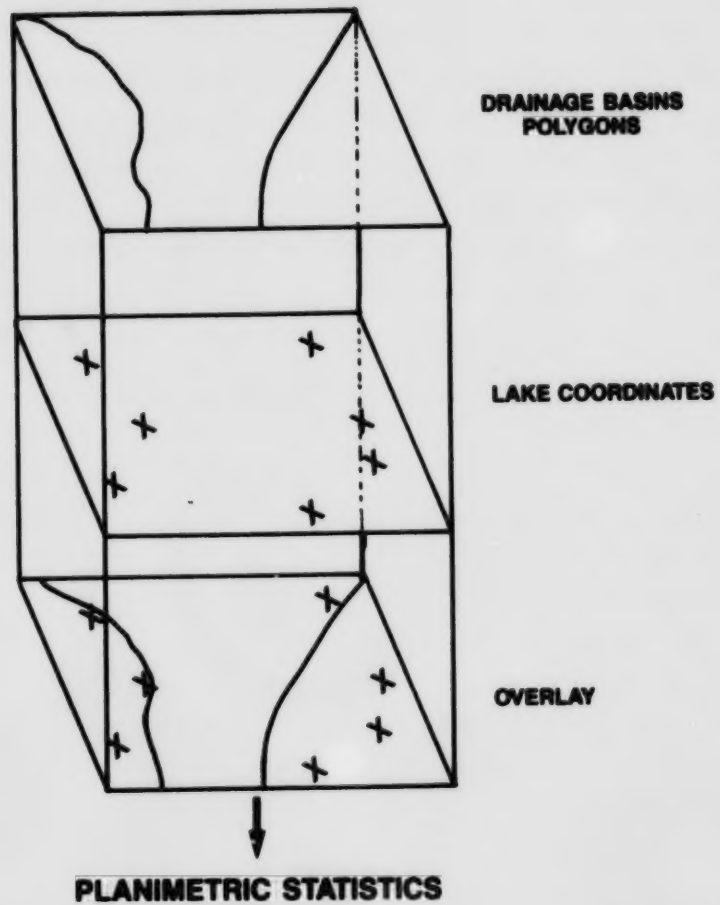


FIGURE 7: Schematic view of the generation of planimetry statistics using a point/polygon overlay method.

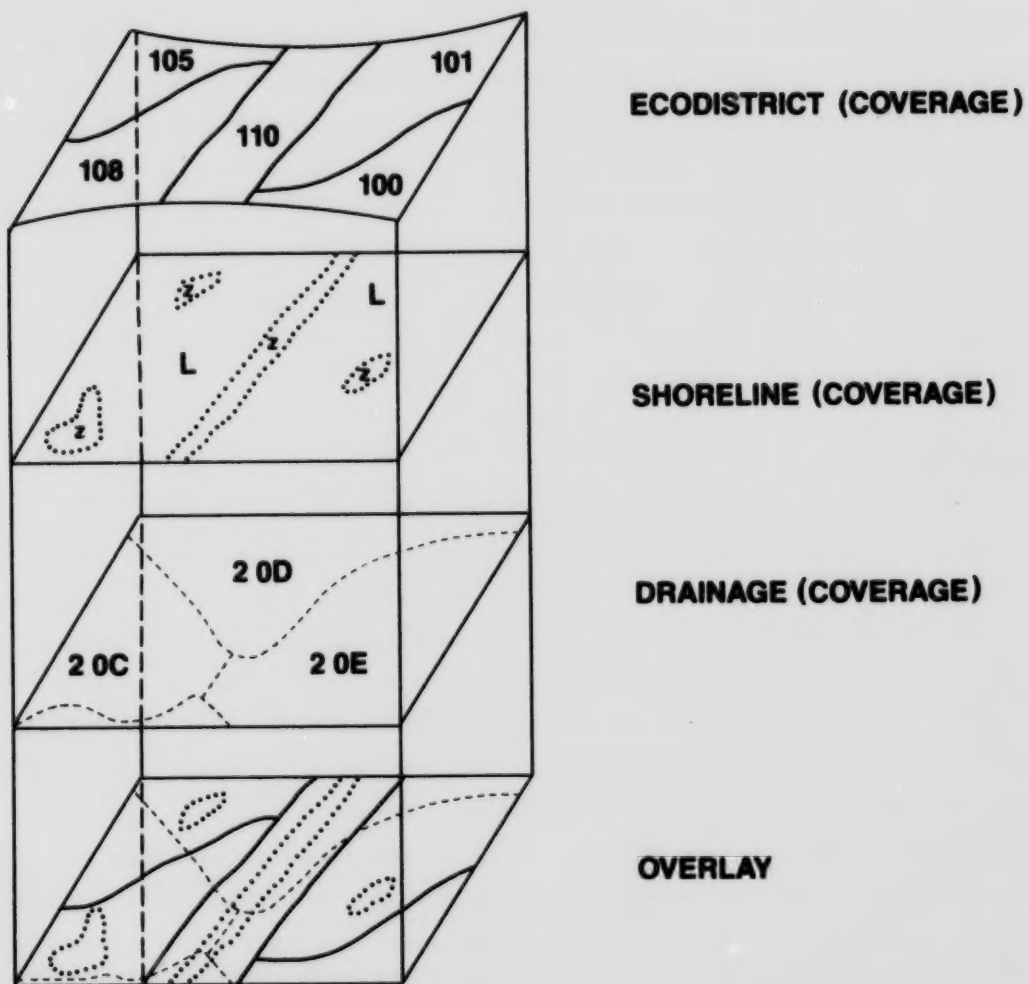


FIGURE 8: Schematic view of the various coverages used in this study. The terrestrial ecodistricts coverage is essential to the surface water resources at risk assessment.

frequency distribution cannot be computed. To solve this problem, the water area from the basic shoreline coverage was replaced by data derived from the provincial lake file (previous section). Analysis of the results provides the best estimate to date for quantitative assessment of surface water resources for that portion of the province.

Through the point-polygon overlay, each lake is assigned an ecodistrict. Each ecodistrict, in turn, is rated as to its potential to reduce acidity. It is then possible to determine the number of lakes which lie within each "potential to reduce" category, assuming that the lakes are distributed homogeneously within the ecodistrict. It is possible also to determine the absolute relative area of each category within the ecodistrict. When the ecodistrict framework and the drainage basin framework are overlain, it is possible to compute an area-weighted distribution of potentially sensitive lakes within each drainage basin.

4.3 Results

Almost three quarters of the study area has a low potential to reduce acidity (Figure 9). The total surface water resources at risk due to acidification is presented in Table 3. Computed from the data in Appendix 5, Table 3, shows the number of lakes within each zone of potential to reduce acidity. The area having a low potential to reduce acidity corresponds to almost 86% of all the inventoried lakes. This amounts to 103,528 lakes. Eleven percent or 13,540 lakes lie within the zone having a moderate potential to reduce acidity or 13.9% of the study area. Only 1.7% of the inventoried lakes lie within a zone having a high potential to reduce acidity, corresponding to 10% of the study area (mostly the St. Lawrence Lowlands). 1.4% (1,678) of the lakes lie upon terrain dominated by organic terrain (2.4% of the study area). Having over one hundred thousand lakes which are potentially sensitive to acidification does not necessarily mean that they are acidified. The lakes must also be subjected to acidic precipitation.

TABLE 3

Area-weighted surface water resources at risk due to acidification, with the corresponding total land area

Terrestrial Potential to Reduce Acidity

	Low	Moderate	High	Organic
Number of Lakes	103,528	13,540	2,016	1,678
Total Lake Surface Area (Hectares)	68,561,514	12,968,062	9,538,874	2,207,878
% Total Lakes	85.7	16.2	1.7	1.4
% Total Study Area	73.5	13.9	10.2	2.4

The portion of the study area which lies south of the 50°N latitude receives 10 or more kilograms per hectare of anthropogenic sulphate each year (Figure 9). Lakes within this zone receive enough atmospheric acidity to stress and eventually harm the aquatic ecosystem. Also, since the lake inventory is largely incomplete north of the 50th parallel, most of the lakes potentially at risk in the areas of low terrestrial potential to reduce acidity (103,528) are also located South of 50°N, within the zone receiving more than 10 kg/ha/yr of sulphate. Therefore, the value of 103,528 is a fair estimate of the true resources at risk due to acidification.

4.4 Lake Size Frequency Distributions

Within individual drainage basins, it is interesting to examine the lake size distribution (Appendix 6). For drainage basins which lie north of latitude 50°N, the inventory is incomplete and mostly larger lakes were counted and measured.

This fact is also indicated by the low percentage of lakes counted but not measured. For drainage basins which lie south of 50°N latitude, the reverse is true: in several of the drainage basins, less than 50% of the lakes are

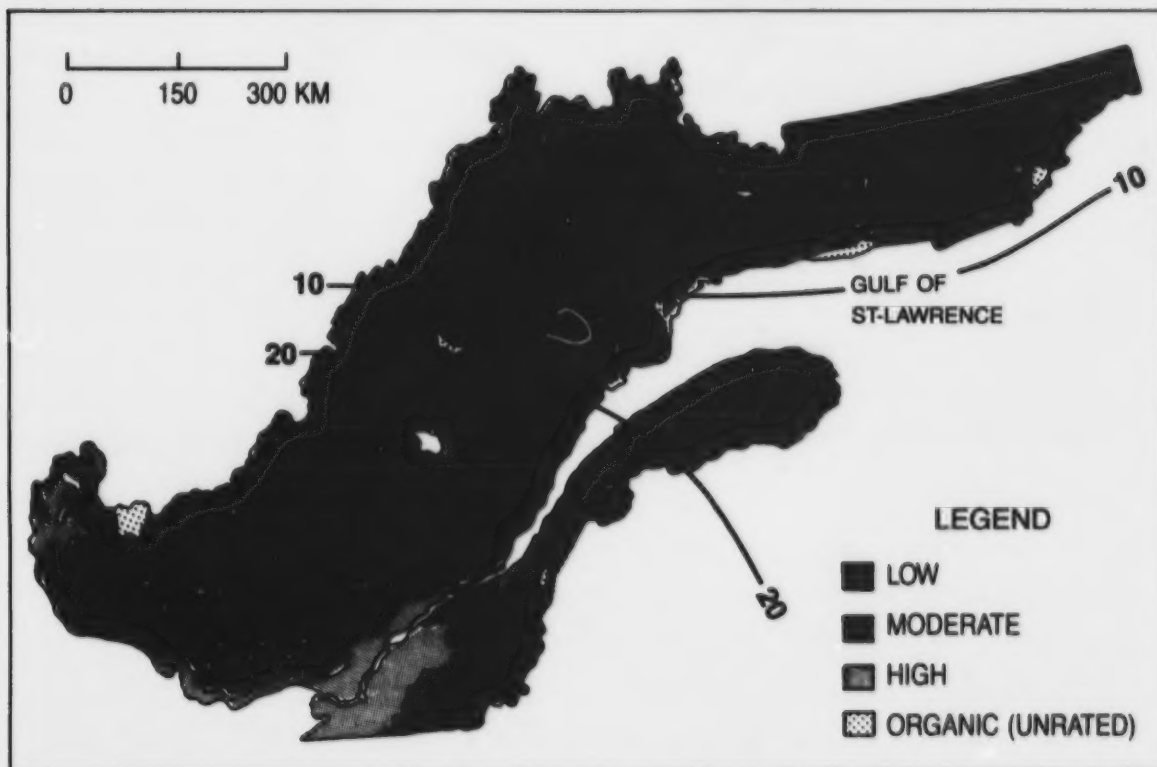


FIGURE 9: Annual sulphate deposition for 1985 in $\text{Kg ha}^{-1}\text{yr}^{-1}$ on southeastern Quebec. (Atmospheric Environment Service.)

measured (see Column 7 in Appendix 4), although lake frequency estimates are accurate. The result is that, although we know how many lakes there are within the drainage basin, we don't know their relative surface areas nor the cumulative water area within the drainage basin. Thus, the determination of surface water resources at risk using this data set is accurate in terms of number of lakes for that portion of the study area which lies south of latitude 50°N. North of that latitude, the lake frequency is underestimated, sometimes to the extent of being unusable. The determination of surface water resources at risk in terms of lake size category and total water area is accurate in some cases, provided the drainage basin lies south of latitude 50°N and that the percentage of lakes without a measured area is low (see Appendix 4).



5.0 DISCUSSION

The determination of surface water resources on a national scale represents a major undertaking. Presently, the national drainage basin coverage represents the best framework from which to extract areas for land and water. The low resolution for lake size, as well as, the error introduced for those drainage basins which are adjacent to large freshwater bodies represent the two major limitations at this time. These limitations, however, do not diminish the usefulness of the data as a first order approximation of planimetric statistics for the whole country. For applications which require more accurate statistics in eastern Canada, the CDR-Model data base at a scale of 1:1,000,000 provides more accurate numbers for land and water statistics within a drainage basin framework. For surface water resources at risk due to acidification, however, a separate data file for lakes had to be introduced.

The estimate of surface water resources in the southeastern portion of Quebec requires highly accurate lake size statistics. At the standard GIS scale used in this study, scales 1:1,000,000, a large portion of the lakes are overlooked as that they fall below the lower resolution threshold of approximately 100 hectares. Most lakes in southeastern Quebec lie on the Canadian Shield and are therefore characteristically small. The provincial lake inventory, compiled at a scale of 1:50,000, provided a much more accurate estimate of surface water resources. With a maximum resolution of about 0.25 hectare, most lakes are represented.

Within the scope of acid deposition, the fraction of lakes smaller than 10 hectares represents the most vulnerable segment of the lake population. Smaller lakes are most susceptible to acidification because of their relative shallowness, their lack of chemical "inertia", and because of the often smaller catchment they occupy.

In a shallow lake, mixing is more thorough than in larger, deeper lakes, which tend to stratify. Impacts on bottom-dwelling organisms are more likely because of the longer contact time with acidic water. Long term in situ neutralizing of the lake water is also inhibited because of the relatively

high flushing rate of smaller lakes and the renewed input of acidic atmospheric water.

The chemistry of smaller lakes is subject to abrupt change. The ratio of water from atmospheric origin to lake volume is much higher in a small lake than in a larger lake. A relatively minor event like a heavy rain shower is apt to alter the lake water chemistry. The lake is then said to have a low chemical inertia. Conversely, the same storm will have no noticeable effect on a larger lake. The storm water volume to lake water volume ratio is lower and the chemical inertia is greater. However, such lakes may be affected by episodic effects such as spring snowmelt, which release enough acidic water in a short time to cause "acid shock".

Lakes and rivers provide valuable habitats for a host of animals and plants. A large portion of this valuable habitat is made up of a large number small lakes and ponds found on the Canadian Shield. The remoteness of the areas and the relative isolation of each lake and open wetland provide prime meeting and staging locations for several species of waterfowl; many species of fish, mammals and other birds are also supported by such environment. In spite of the fact that small lakes and wetlands do not collectively add up to a great percentage of the total water resource within the study area, their frequency and distribution make them an extremely important resource worthy of protection.

Most of the interaction (including neutralization) with atmospheric water occurs within the catchment: a relatively small portion of the precipitation falls directly into a lake. The ratio of the lake area to its catchment, therefore, controls the extent and duration of neutralizing reactions. As the catchment area increases with respect to the lake area, its influence on water quality increases. For smaller lakes in the Canadian Shield, small catchments, with their thin and sandy surficial deposits and steep slopes, inhibit long interaction between the terrestrial ecosystem and atmospheric water which enters the lake relatively unchanged. Smaller lakes are most vulnerable to acidic precipitation than larger lakes.

6.0 CONCLUSIONS

The provincial lake file is the most accurate data base available for Quebec. Lake inventories also exist in the other Eastern provinces but they were designed for specific purposes other than a comprehensive survey of all lakes in the province. The province of Ontario is an exception. A study by Cox (1978) provides a comprehensive inventory for all lakes in Ontario, albeit at 4 different scales. The data base, unfortunately, is not yet in a digital form. An overlay with areas having different terrestrial potential to reduce acidity is not yet possible through GIS technologies. Consequently, quantitative estimates of surface water resources at risk due to acidification are not yet feasible. Because the southern half of Ontario receives more than 10 kg ha⁻¹ of sulphate per year, such a study may be desirable in the near future.

To eliminate the data gaps in terms of surface water resources in the Atlantic provinces, remote sensing methodologies are being explored. The Thematic Mapper of Landsat 5 is well suited to identify lakes on a regional scale and with a high degree of resolution. Preliminary results indicate that the remote sensing approach can be used to extract lake geographical coordinates, the area of the lake, as well as its perimeter (Wickware and Hélie, in preparation). The resulting point file can then be used, as was the Environment Quebec point file, as an overlay on a geographic information system to determine the surface water resources at risk due to acidification for the Atlantic provinces.

Once reliable estimates on our lake resources are established, they will provide the basis upon which the regional acidification models will predict quantitatively the extent to which aquatic resources will be altered by different loadings scenarios of anthropogenic sulphates. Once a critical loading is established as the level at which damage is caused to surface waters, we will be able to translate the value into absolute number of lakes which are at risk in Southeastern Quebec as well as the rest of Eastern Canada.



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A P P E N D I X 1

DRAINAGE BASIN PLANIMETRY FOR CANADA

SCALE - 1:2,000,000

MAIN DRAINAGE BASIN COMPILATION

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
01	*	*	16277600.86	101579.86	16379180.72
02	*	*	94754905.61	12547459.15	107302364.9
03	*	*	108169566.7	6605709.29	114775276.1
04	*	*	68847727.35	2270845.11	71118572.46
05	*	*	91037108.21	7244545.87	98281654.08
06	*	*	86725516.69	7676950.42	94402467.11
07	*	*	86636108.16	6898845.23	93534953.39
08	*	*	67216957.22	1194539.63	68411496.85
09	*	*	35742891.83	348562.64	36091454.47
10	*	*	267437221.9	8551196.40	275988417.8
11	*	*	2763204.10	16740.66	2779944.76

DRAINAGE BASIN SUBDIVISION COMPILATION

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
01	A	*	4193520.41	47267.62	4240788.03
01	B	*	6015945.77	0.00	6015945.77
01	C	*	575925.73	2575.23	578500.96
01	D	*	2038849.57	3762.69	2042612.26
01	E	*	2385604.03	35043.86	2420647.89
01	F	*	1067755.35	12930.46	1080685.81
02	A	*	3948687.78	1828748.56	5777436.34
02	B	*	3957150.62	1618344.56	5575495.18
02	C	*	3312016.12	1196707.19	4508723.31
02	D	*	1752041.64	182617.52	1934659.16
02	E	*	2094461.46	861246.63	2955708.09
02	F	*	1501395.57	1783503.65	3284899.22
02	G	*	2279152.52	1268818.66	3547971.18
02	H	*	2814765.58	1057409.47	3872175.05
02	J	*	4869288.14	275069.63	5144357.77
02	K	*	3944292.60	128260.59	4072553.19
02	L	*	5247767.99	198126.19	5445894.18
02	M	*	494089.86	116155.40	610245.26
02	N	*	4221512.08	224169.22	4445681.30
02	O	*	3480750.91	135532.04	3616282.95
02	P	*	3772942.97	76423.92	3849366.89
02	Q	*	1333557.18	0.00	1333557.18
02	R	*	8521629.43	237738.08	8759367.51
02	S	*	2602726.01	131895.61	2734621.62
02	T	*	6184431.14	544739.60	6729170.74
02	U	*	3915549.02	78320.35	3993869.37
02	V	*	3636631.89	81158.73	3717790.62
02	W	*	5166765.44	198784.81	5365550.25
02	X	*	4949345.42	76298.86	5025644.28
02	Y	*	6235418.35	179523.02	6414941.37

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
02	Z	*	4518535.89	67866.86	4586402.75
03	A	*	6158999.64	334729.53	6493729.17
03	B	*	6636354.34	620022.78	7256377.12
03	C	*	5230462.16	77437.96	5307900.12
03	D	*	10691493.87	482601.03	11174094.90
03	E	*	6014123.18	336006.40	6350129.58
03	F	*	3279881.93	490038.19	3769920.12
03	G	*	9952702.09	469680.08	10422382.17
03	H	*	8141239.04	331431.45	8472670.49
03	J	*	5033803.34	299042.53	5332845.87
03	K	*	4483177.56	99269.97	4582447.53
03	L	*	8693051.26	625154.80	9318206.06
03	M	*	10085448.17	499905.19	10585353.36
03	N	*	8226247.40	290648.69	8516896.09
03	O	*	7535453.06	1046924.86	8582377.92
03	P	*	3418466.75	523108.25	3941575.00
03	Q	*	4588662.90	79707.58	4668370.48
04	A	*	10143639.59	722741.87	10866381.46
04	B	*	3448951.27	1820.35	3450771.62
04	C	*	7867326.36	485494.89	8352821.25
04	D	*	6752356.06	209330.19	6961686.25
04	E	*	5170189.88	13484.90	5183674.78
04	F	*	4575704.57	82238.50	4657943.07
04	G	*	6019094.37	414792.39	6433886.76
04	H	*	3890624.64	24522.95	3915147.59
04	J	*	5116852.34	67687.66	5184540.00
04	K	*	1522815.96	0.00	1522815.96
04	L	*	6347166.70	69907.78	6417074.48
04	M	*	3594392.05	128597.57	3722989.62
04	N	*	4398613.56	50226.06	4448839.62
05	A	*	4669706.26	12985.63	4682691.89
05	B	*	2525738.76	11197.05	2536935.81
05	C	*	4858158.31	47442.99	4905601.30
05	D	*	2811799.41	7749.25	2819548.66
05	E	*	4213293.49	58971.66	4272265.15
05	F	*	2985432.40	37132.56	3022564.96
05	G	*	5191251.90	16055.07	5207306.97
05	H	*	5430859.20	88848.24	5519707.44
05	J	*	7013754.81	77020.78	7090775.59
05	K	*	7098870.53	964987.18	8063857.71
05	L	*	7008693.05	1269932.27	8278625.32
05	M	*	5100323.86	96543.96	5196867.82
05	N	*	3848853.38	16516.09	3865369.47
05	O	*	2558783.88	10298.14	2569082.02
05	P	*	4923798.29	703203.02	5627001.31
05	Q	*	4606191.62	596398.69	5202590.31
05	R	*	5445250.78	790877.44	6236128.22
05	S	*	2369383.60	1737767.62	4107151.22
05	T	*	3976714.04	245325.17	4222039.21
05	U	*	4400250.64	455293.06	4855543.70
06	A	*	4629820.67	260172.29	4889992.96
06	B	*	4004787.95	446338.94	4451126.89
06	C	*	4055870.00	518132.16	4574002.16

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
06	D	*	5399744.69	1109087.09	6508831.78
06	E	*	4486406.92	652510.78	5138917.70
06	F	*	5295653.01	190732.78	5486385.79
06	G	*	7184535.65	408148.54	7592684.19
06	H	*	6888468.75	605361.38	7493830.13
06	J	*	5726663.56	350616.73	6077280.29
06	K	*	6025049.32	1041063.31	7066112.63
06	L	*	6422062.32	959790.48	7381852.80
06	M	*	6345516.64	632697.36	6978214.00
06	N	*	5779063.93	335591.88	6114655.81
06	O	*	7692859.96	102100.79	7794960.75
06	P	*	6789013.32	64605.91	6853619.23
07	A	*	2696081.96	0.00	2696081.96
07	B	*	3956114.06	128826.99	4084941.05
07	C	*	5518435.78	135039.25	5653475.03
07	D	*	2912408.39	20471.85	2932880.24
07	E	*	7002872.75	213037.02	7215909.77
07	F	*	6665650.95	0.00	6665650.95
07	G	*	5102342.91	9564.95	5111907.86
07	H	*	3574128.22	13295.74	3587423.96
07	J	*	5751631.54	109921.68	5861553.22
07	K	*	3440737.80	204735.65	3645473.45
07	L	*	5347798.74	690785.90	6038584.64
07	M	*	3198069.86	818705.26	4016775.12
07	N	*	1579458.12	330684.97	1910143.09
07	O	*	5137776.88	24262.84	5162039.72
07	P	*	3396164.22	484018.72	3880182.94
07	Q	*	7415854.59	1064469.41	8480324.00
07	R	*	2239765.12	485670.76	2725435.88
07	S	*	6610329.20	798351.84	7408681.04
07	T	*	2217814.64	377405.02	2595219.66
07	U	*	2872672.43	989597.38	3862269.81
08	A	*	3171945.49	349804.59	3521750.08
08	B	*	2242999.82	0.00	2242999.82
08	C	*	5041499.32	0.00	5041499.32
08	D	*	2848095.55	0.00	2848095.55
08	E	*	5571328.87	72060.83	5643389.70
08	F	*	5395940.15	53817.21	5449757.36
08	G	*	4282900.54	50002.83	4332903.37
08	H	*	3415496.72	21771.29	3437268.01
08	J	*	4350250.32	314283.93	4664534.25
08	K	*	6546473.49	68226.52	6614700.01
08	L	*	5463101.95	101888.89	5564990.84
08	M	*	6244165.32	47930.58	6292095.90
08	N	*	10083997.67	114752.96	10198750.63
08	O	*	964249.26	0.00	964249.26
08	P	*	1594512.75	0.00	1594512.75
09	A	*	9213896.41	262952.84	9476849.25
09	B	*	5004620.44	10362.45	5014982.89
09	C	*	4390549.79	45991.75	4436541.54
09	D	*	5094898.93	29255.60	5124154.53
09	E	*	3371976.02	0.00	3371976.02
09	F	*	5799584.55	0.00	5799584.55
09	H	*	2867365.69	0.00	2867365.69

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
10	A	*	3706225.01	34961.66	3741186.67
10	B	*	7389579.35	10949.90	7400529.25
10	C	*	5492195.01	337.03	5492532.04
10	D	*	3015955.55	70669.82	3086625.37
10	E	*	5468022.63	51209.75	5519232.38
10	F	*	5007881.92	184404.16	5192286.08
10	G	*	5614405.16	159616.81	5774021.97
10	H	*	6762550.85	93727.94	6856278.79
10	J	*	12053873.78	3706001.38	15759875.16
10	K	*	4589193.66	108231.72	4697425.38
10	L	*	7175513.78	301745.18	7477258.96
10	M	*	10554078.09	41251.95	10595330.04
10	N	*	6923370.65	389349.23	7312719.88
10	O	*	8074372.45	140340.37	8214712.82
10	P	*	5074569.53	501190.26	5575759.79
10	Q	*	12232753.17	145613.83	12378367.00
10	R	*	14641836.11	637486.05	15279322.16
10	S	*	15745607.77	228926.60	15974534.37
10	T	*	35541982.73	652510.92	36194493.65
10	U	*	52784526.12	1013663.68	53798189.80
10	V	*	39588728.46	79008.16	39667736.62
11	A	*	2763204.10	16740.66	2779944.76

DRAINAGE BASIN SUB-SUBDIVISIONS

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
01	A	A	140026.32		140026.32
01	A	B	124395.54		124395.54
01	A	D	555315.93	6962.75	562278.68
01	A	F	369600.34		369600.34
01	A	G	10424.28		10424.28
01	A	H	424302.01	3496.64	427798.65
01	A	J	230737.93		230737.93
01	A	K	360442.15		360442.15
01	A	L	170866.71		170866.71
01	A	M	212266.69	4672.99	216939.68
01	A	N	185662.34		185662.34
01	A	O	224295.21	19430.31	243725.52
01	A	P	586626.28		586626.28
01	A	Q	330336.95	3798.64	334135.59
01	A	R	268221.73	8906.29	277128.02
01	B	A	167622.29		167622.29
01	B	B	154371.42		154371.42
01	B	C	214942.79		214942.79
01	B	D	366872.65		366872.65
01	B	E	237947.69		237947.69
01	B	F	220999.72		220999.72
01	B	G	784996.67		784996.67
01	B	H	682587.14		682587.14
01	B	J	294987.11		294987.11
01	B	K	233669.38		233669.38
01	B	L	354203.45		354203.45
01	B	M	287282.80		287282.80
01	B	N	204331.82		204331.82
01	B	O	398722.15		398722.15
01	B	Q	209414.91		209414.91
01	B	R	342036.07		342036.07
01	B	S	245732.19		245732.19
01	B	T	141704.46		141704.46
01	B	U	249053.71		249053.71
01	B	V	224467.35		224467.35
01	C	A	119228.72		119228.72
01	C	B	128958.75		128958.75
01	C	C	112462.45	2575.23	115037.68
01	C	D	97163.45		97163.45
01	C	E	118112.36		118112.36
01	D	A	63327.63	1788.00	65115.63
01	D	B	137501.11		137501.11
01	D	C	198316.94		198316.94
01	D	D	114735.07		114735.07
01	D	E	127534.65		127534.65
01	D	F	102777.15		102777.15
01	D	G	253344.52	1974.69	255319.21
01	D	H	131795.76		131795.76
01	D	J	94714.13		94714.13
01	D	K	89747.22		89747.22
01	D	L	127897.16		127897.16
01	D	M	38786.62		38786.62

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
01	D	N	145406.90		145406.9
01	D	O	93682.49		93682.49
01	D	P	110846.88		110846.88
01	D	Q	68383.44		68383.44
01	D	R	92433.93		92433.93
01	D	S	47617.97		47617.97
01	E	A	211822.90	3257.82	215080.72
01	E	B	154892.46	2124.01	157016.47
01	E	C	145111.45		145111.45
01	E	D	289254.12	22577.34	311831.46
01	E	E	202026.61	4698.53	206725.14
01	E	F	186908.84	2386.16	189295
01	E	G	106147.04		106147.04
01	E	H	102510.09		102510.09
01	E	J	105533.02		105533.02
01	E	K	151009.32		151009.32
01	E	L	116649.73		116649.73
01	E	M	91825.74		91825.74
01	E	N	126422.84		126422.84
01	E	P	69652.39		69652.39
01	E	Q	268857.77		268857.77
01	E	R	56979.71		56979.71
01	F	A	129028.21		129028.21
01	F	B	124368.57	5727.66	130096.23
01	F	C	78114.99		78114.99
01	F	D	104848.07		104848.07
01	F	E	84945.05		84945.05
01	F	F	82636.11		82636.11
01	F	G	79061.98		79061.98
01	F	H	97344.30	1602.71	98947.01
01	F	J	287408.07	5600.09	293008.16
02	A	A	210025.11	91001.59	301026.7
02	A	B	821973.46	50250.05	872223.51
02	A	C	658417.61	953068.51	1611486.12
02	A	D	2018182.71	479318.96	2497501.67
02	A	E	240088.89	255109.45	495198.34
02	B	A	506741.05	474555.28	981296.33
02	B	B	660271.18	16166.36	676437.54
02	B	C	776867.48	408006.30	1184873.78
02	B	D	956038.82	134830.37	1090869.19
02	B	E	551791.94	406591.63	958383.57
02	B	F	505440.15	178194.62	683634.77
02	C	A	333519.82	80400.26	413920.08
02	C	B	533522.12	13448.77	546970.89
02	C	C	357085.78	72152.06	429237.84
02	C	D	257509.52	58519.84	316029.36
02	C	E	874717.91	46365.48	921083.39
02	C	F	655245.59	109042.03	764287.62
02	C	G	300415.38	816778.75	1117194.13
02	D	A	225615.18	17624.39	243239.57
02	D	B	110805.90		110805.9
02	D	C	635307.71	54092.03	689399.74
02	D	D	780312.85	110901.10	891213.95

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
02	E	A	603333.19	534197.77	1137530.96
02	E	B	507494.40	116301.97	623796.37
02	E	C	534874.69	85388.04	620262.73
02	E	D	448759.18	125358.85	574118.03
02	F	A	215933.41	885307.42	1101240.83
02	F	B	180548.13	206521.13	387069.26
02	F	C	399436.03	8462.17	407898.2
02	F	D	134796.31	425901.71	560698.02
02	F	E	266645.29	51302.91	317948.2
02	F	F	304036.40	206008.31	510044.71
02	G	A	474683.77	1803.42	476487.19
02	G	B	200739.83	36176.50	236916.33
02	G	C	396881.15	487304.09	884185.24
02	G	D	308445.15		308445.15
02	G	E	247185.81	6303.88	253489.69
02	G	F	85717.84	431966.70	517684.54
02	G	G	381924.87	26008.65	407933.52
02	G	H	183574.10	279255.42	462829.52
02	H	A	260885.71	117328.37	378214.08
02	H	B	207458.02	78794.35	286252.37
02	H	C	268116.93	147002.98	415119.91
02	H	D	159385.72	310373.68	469759.4
02	H	E	109850.03	315453.62	425303.65
02	H	F	322125.92	8785.22	330911.14
02	H	G	95458.47	7261.29	102719.76
02	H	H	286425.90	24758.42	311184.32
02	H	J	155327.47	8779.24	164106.71
02	H	K	373923.05	624.69	374547.74
02	H	L	282198.00	1180.68	283378.68
02	H	M	293610.36	37066.93	330677.29
02	J	A	1003914.37	70423.20	1074337.57
02	J	B	1206119.32	88096.32	1294215.64
02	J	C	543870.65	9192.38	553063.03
02	J	D	642131.76	14983.07	657114.83
02	J	E	1473252.04	92374.66	1565626.7
02	K	A	375112.58	19468.87	394581.45
02	K	B	407202.30	10256.79	417459.09
02	K	C	615819.89	28558.68	644378.57
02	K	D	569047.76	18781.43	587829.19
02	K	E	244798.26	4901.69	249699.95
02	K	F	448521.95	19828.80	468350.75
02	K	G	500150.99	5444.52	505595.51
02	K	H	262685.47	4470.24	267155.71
02	K	J	520953.40	16549.57	537502.97
02	L	A	371954.00	16054.15	388008.15
02	L	B	553669.34	17530.07	571199.41
02	L	C	743851.26	2105.21	745956.47
02	L	D	264560.30	6868.20	271428.5
02	L	E	659773.56	15193.06	674966.62
02	L	F	354731.97	10842.15	365574.12
02	L	G	1433831.99	113515.78	1547347.77
02	L	H	865395.57	16017.57	881413.14

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
02	M	A	206422.80	37852.72	244275.52
02	M	B	63003.67	22956.38	85960.05
02	M	C	224663.39	55346.30	280009.69
02	N	A	1310033.87	155159.30	1465193.17
02	N	B	414785.38	38254.60	453039.98
02	N	C	812721.38	6039.71	818761.09
02	N	D	257638.22		257638.22
02	N	E	638252.42	2524.52	640776.94
02	N	F	538880.14	17475.82	556355.96
02	N	G	249200.67	4715.27	253915.94
02	O	A	436561.98	55552.85	492114.83
02	O	B	535332.74	5245.60	540578.34
02	O	C	342165.76	21142.50	363308.26
02	O	D	362243.08	3293.62	365536.7
02	O	E	672194.65	12837.28	685031.93
02	O	F	233580.80	8906.43	242487.23
02	O	G	495393.20	7474.54	502867.74
02	O	H	136284.46	7054.41	143338.87
02	O	J	266994.24	14024.81	281019.05
02	P	A	506583.62	9643.41	516227.03
02	P	B	284181.48		284181.48
02	P	C	309384.75	3318.70	312703.45
02	P	D	189885.35	673.13	190558.48
02	P	E	304062.30	20964.82	325027.12
02	P	F	313079.40		313079.4
02	P	G	296985.08		296985.08
02	P	H	397406.22	13488.22	410894.44
02	P	J	695376.44	1017.41	696393.85
02	P	K	205846.97	26352.59	232199.56
02	P	L	270151.36	965.64	271117
02	Q	A	565167.32		565167.32
02	Q	B	371472.86		371472.86
02	Q	C	396917.00		396917
02	R	A	924051.68	5667.36	929719.04
02	R	B	456005.04	3519.40	459524.44
02	R	C	1440867.98	86387.04	1527255.02
02	R	D	1227900.58	13950.28	1241850.86
02	R	E	954607.48		954607.48
02	R	F	1558220.47	26348.80	1584569.27
02	R	G	489310.55	93580.37	582890.92
02	R	H	1470665.65	8284.83	1478950.48
02	S	A	1202341.35	120046.69	1322388.04
02	S	B	627684.34	8066.41	635750.75
02	S	C	772700.32	3782.51	776482.83
02	T	A	1350690.92	72309.18	1423000.1
02	T	B	1562344.95	219293.92	1781638.87
02	T	C	1584179.87	98213.90	1682393.77
02	T	D	945560.99	58084.13	1003645.12
02	T	E	741654.41	96838.47	838492.88
02	U	A	1141515.99	10434.91	1151950.9
02	U	B	698069.16	2580.30	700649.46
02	U	C	2075963.87	65305.14	2141269.01

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
02	V	A	606448.79	13342.96	619791.75
02	V	B	1577256.55	36107.04	1613363.59
02	V	C	1452926.55	31708.73	1484635.28
02	W	A	1287440.62	40670.12	1328110.74
02	W	B	1596752.78	48227.15	1644979.93
02	W	C	1491324.60	109887.54	1601212.14
02	W	D	791247.44		791247.44
02	X	A	2261175.25	46328.94	2307504.19
02	X	B	1230754.47	17990.64	1248745.11
02	X	C	974097.34	9983.15	984080.49
02	X	D	483318.36	1996.13	485314.49
02	Y	A	175391.93	5717.48	181109.41
02	Y	B	231858.81		231858.81
02	Y	C	177930.07	1441.95	179372.02
02	Y	D	210889.35		210889.35
02	Y	E	291051.23	17144.17	308195.4
02	Y	F	261779.30		261779.3
02	Y	G	239625.65		239625.65
02	Y	H	249180.92	2924.01	252104.93
02	Y	J	265289.37	1758.71	267048.08
02	Y	K	401420.36	61807.50	463227.86
02	Y	L	353365.44	1754.28	355119.72
02	Y	M	302915.10	4957.79	307872.89
02	Y	N	541449.08	33359.61	574808.69
02	Y	O	774312.00	8940.94	783252.94
02	Y	P	283949.34	4010.71	287960.05
02	Y	Q	571757.79	15572.96	587330.75
02	Y	R	486245.17	10919.20	497164.37
02	Y	S	417007.44	9213.71	426221.15
02	Z	A	544908.41	582.33	545490.74
02	Z	B	297209.49		297209.49
02	Z	C	409817.45	7354.67	417172.12
02	Z	D	439292.66	21028.32	460320.98
02	Z	E	453548.93	20440.66	473989.59
02	Z	F	470262.29	16218.70	486480.99
02	Z	G	318075.22		318075.22
02	Z	H	315667.48	1135.76	316803.24
02	Z	J	306047.06		306047.06
02	Z	K	315908.31		315908.31
02	Z	L	187634.86		187634.86
02	Z	M	279375.27	1106.42	280481.69
02	Z	N	180788.46		180788.46
03	A	A	1852881.80	132548.74	1985430.54
03	A	B	1220058.75	97203.71	1317262.46
03	A	C	1873637.88	49688.71	1923326.59
03	A	D	1212421.21	55288.37	1267709.58
03	B	A	1462403.49	297200.36	1759603.85
03	B	B	1735084.34	100435.76	1835520.1
03	B	C	1510112.41	37056.95	1547169.36
03	B	D	1100683.77	107271.83	1207955.6
03	B	E	828070.33	78057.88	906128.21
03	C	A	1456276.45	20019.52	1476295.97

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
03	C	B	1332018.57	17299.18	1349317.75
03	C	C	1139081.42	57.69	1139139.11
03	C	D	199143.51		199143.51
03	C	E	1103942.21	40061.57	1144003.78
03	D	A	2327098.02	190084.66	2517182.68
03	D	B	1722138.12	51180.05	1773318.17
03	D	C	2684631.80	93637.43	2778269.23
03	D	D	1223183.28	15717.34	1238900.62
03	D	E	755522.60	12364.62	767887.22
03	D	F	474762.36		474762.36
03	D	G	402574.50	10677.15	413251.65
03	D	H	1101583.19	108939.78	1210522.97
03	E	A	1084205.15	214510.38	1298715.53
03	E	B	790601.20		790601.2
03	E	C	496307.23	5796.92	502104.15
03	E	D	1555947.91	52323.16	1608271.07
03	E	E	2087061.69	63375.94	2150437.63
03	F	A	1099979.44	110549.71	1210529.15
03	F	B	1065044.29	236589.59	1301633.88
03	F	C	1114858.20	142898.89	1257757.09
03	G	A	1399707.91	36751.46	1436459.37
03	G	B	2008625.15	110525.00	2119150.15
03	G	C	1647632.95	85584.38	1733217.33
03	G	D	2703251.77	220559.80	2923811.57
03	G	E	2193484.31	16259.44	2209743.75
03	H	A	4652604.23	205308.33	4857912.56
03	H	B	996487.26	114682.58	1111169.84
03	H	C	2492147.55	11440.54	2503588.09
03	J	A	1666899.05	174522.72	1841421.77
03	J	B	2158504.87	76351.93	2234856.8
03	J	C	1208399.42	48167.88	1256567.3
03	K	A	841333.21	12377.32	853710.53
03	K	B	2106103.49	46405.65	2152509.14
03	K	C	743123.12	12356.70	755479.82
03	K	D	178762.73	4805.36	183568.09
03	K	E	613855.01	23324.94	637179.95
03	L	A	1873321.24	258135.28	2131456.52
03	L	B	941873.15	73690.88	1015564.03
03	L	C	1295186.77	40685.80	1335872.57
03	L	D	1492582.93	153793.59	1646376.52
03	L	E	2567124.25	88872.02	2655996.27
03	L	F	522962.92	9977.23	532940.15
03	M	A	2647126.58	207327.47	2854454.05
03	M	B	2410890.61	170358.30	2581248.91
03	M	C	950249.27	6974.32	957223.59
03	M	D	4077181.71	115245.10	4192426.81
03	N	A	724097.54	4299.07	728396.61
03	N	B	946355.99	4611.23	950967.22
03	N	C	699848.52	18105.50	717954.02
03	N	D	866555.29	32694.73	899250.02
03	N	E	1679976.81	51726.65	1731703.46
03	N	F	1548653.35	39086.58	1587739.93

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
03	N	G	1760759.90	140124.93	1900884.83
03	O	A	1760742.46	154900.84	1915643.3
03	O	B	1077188.50	487371.59	1564560.09
03	O	C	1920285.99	305107.15	2225393.14
03	O	D	1173403.38	61901.32	1235304.7
03	O	E	1603832.73	37643.96	1641476.69
03	P	A	400184.99	361283.16	761468.15
03	P	B	1603967.45	125425.00	1729392.45
03	P	C	1414314.31	36400.09	1450714.4
03	Q	A	572230.59	4141.88	576372.47
03	Q	B	376523.19	2181.72	378704.91
03	Q	C	3639909.12	73383.98	3713293.1
04	A	A	1054710.61	142932.14	1197642.75
04	A	B	921642.54	1024.42	922666.96
04	A	C	2727122.51	382669.75	3109792.26
04	A	D	2007576.81	99329.22	2106906.03
04	A	E	1835113.62	19573.50	1854687.12
04	A	F	1597473.50	77212.84	1674686.34
04	B	A	583092.90		583092.9
04	B	B	793685.56		793685.56
04	B	C	727221.95	1820.35	729042.3
04	B	D	1344950.86		1344950.86
04	C	A	1264413.59	145005.40	1409418.99
04	C	B	1484049.80	149856.56	1633906.36
04	C	C	1859014.61	44926.97	1903941.58
04	C	D	1998935.63	60645.79	2059581.42
04	C	E	1260912.73	85060.17	1345972.9
04	D	A	2045490.57	153819.97	2199310.54
04	D	B	2625889.11	51229.12	2677118.23
04	D	C	940800.11		940800.11
04	D	D	1140176.27	4281.10	1144457.37
04	E	A	1538910.09	4167.01	1543077.1
04	E	B	495079.51		495079.51
04	E	C	1954417.02	9317.89	1963734.91
04	E	D	1181783.26		1181783.26
04	F	A	1805528.12	28643.78	1834171.9
04	F	B	966618.31	31674.35	998292.66
04	F	C	1803558.14	21920.37	1825478.51
04	G	A	1346870.60	191766.57	1538637.17
04	G	B	1306964.64	136046.17	1443010.81
04	G	C	833268.74	39821.43	873090.17
04	G	D	1103113.04	24655.80	1127768.84
04	G	E	726196.19	14700.23	740896.42
04	G	F	702681.16	7802.19	710483.35
04	H	A	1810780.68	24522.95	1835303.63
04	H	B	434151.80		434151.8
04	H	C	396169.63		396169.63
04	H	D	1249522.53		1249522.53
04	J	A	358697.05		358697.05
04	J	B	527101.41		527101.41
04	J	C	881898.13	9341.34	891239.47
04	J	D	1271077.45	29780.26	1300857.71

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
04	J	E	454730.51	3498.67	458229.18
04	J	F	1145047.68	25067.39	1170115.07
04	J	G	478300.11		478300.11
04	K	A	1522815.96		1522815.96
04	L	A	638765.64	20386.95	659152.59
04	L	B	501761.33		501761.33
04	L	C	1010263.54	20339.55	1030603.09
04	L	D	290275.15		290275.15
04	L	E	414670.15	3239.96	417910.11
04	L	F	452329.81	3035.29	455365.1
04	L	G	664451.92		664451.92
04	L	H	460888.87	13802.65	474691.52
04	L	J	474497.83	4446.27	478944.1
04	L	K	620556.01		620556.01
04	L	L	530872.24	4657.11	535529.35
04	L	M	287834.21		287834.21
04	M	A	812716.45	104722.32	917438.77
04	M	B	309738.07		309738.07
04	M	C	355399.20		355399.2
04	M	D	424659.94	14848.31	439508.25
04	M	E	954451.01	6357.17	960808.18
04	M	F	737427.38	2669.77	740097.15
04	N	A	1035841.88	22395.14	1058237.02
04	N	B	1237244.61		1237244.61
04	N	C	2125527.07	27830.92	2153357.99
05	A	A	491518.31		491518.31
05	A	B	409177.78		409177.78
05	A	C	817127.73		817127.73
05	A	D	459344.16		459344.16
05	A	E	238303.29		238303.29
05	A	F	465496.20	12985.63	478481.83
05	A	G	367366.53		367366.53
05	A	H	626975.56		626975.56
05	A	J	314920.34		314920.34
05	A	K	479476.36		479476.36
05	B	A	151883.25		151883.25
05	B	B	78735.51		78735.51
05	B	C	72449.07		72449.07
05	B	D	68280.18		68280.18
05	B	E	110124.44		110124.44
05	B	F	101944.87		101944.87
05	B	G	94545.17		94545.17
05	B	H	207894.82		207894.82
05	B	J	115402.83		115402.83
05	B	K	75149.32		75149.32
05	B	L	399022.31		399022.31
05	B	M	530193.92		530193.92
05	B	N	520113.07	11197.05	531310.12
05	C	A	449432.41		449432.41
05	C	B	367286.72		367286.72
05	C	C	561269.77	14427.12	575696.89
05	C	D	482917.43	11078.19	493995.62

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
05	C	E	986755.57		986755.57
05	C	F	296916.75	21937.68	318854.43
05	C	G	311597.49		311597.49
05	C	H	349065.39		349065.39
05	C	J	442607.91		442607.91
05	C	K	610308.87		610308.87
05	D	A	393463.43		393463.43
05	D	B	333137.99		333137.99
05	D	C	608933.29		608933.29
05	D	D	706010.47		706010.47
05	D	E	466270.56	7749.25	474019.81
05	D	F	303983.67		303983.67
05	E	A	349040.72		349040.72
05	E	B	405821.55	20743.45	426565
05	E	C	662861.85		662861.85
05	E	D	583830.65	6874.75	590705.4
05	E	E	737981.60	4228.38	742209.98
05	E	F	610519.09		610519.09
05	E	G	863238.03	27125.08	890363.11
05	F	A	702257.23	37132.56	739389.79
05	F	B	521208.29		521208.29
05	F	C	453190.80		453190.8
05	F	D	445203.06		445203.06
05	F	E	470782.68		470782.68
05	F	F	392790.34		392790.34
05	G	A	1478969.06		1478969.06
05	G	B	874281.13	3134.26	877415.39
05	G	C	1063429.37	4239.41	1067668.78
05	G	D	599821.58	8675.67	608497.25
05	G	E	306256.86	5.73	306262.59
05	G	F	539340.49		539340.49
05	G	G	329153.41		329153.41
05	H	A	671410.22	9014.82	680425.04
05	H	B	645470.24		645470.24
05	H	C	853833.05	20283.74	874116.79
05	H	D	419157.72	4160.01	423317.73
05	H	E	252202.64	22804.65	275007.29
05	H	F	776034.73	27476.67	803511.4
05	H	G	969413.27		969413.27
05	H	H	843337.33	5108.35	848445.68
05	J	A	576950.23	5633.48	582583.71
05	J	B	448578.97		448578.97
05	J	C	540213.51	6006.91	546220.42
05	J	D	681980.24	34985.30	716965.54
05	J	E	582217.87		582217.87
05	J	F	495049.05		495049.05
05	J	G	758019.91	2335.38	760355.29
05	J	H	657731.79	27988.87	685720.66
05	J	J	486205.61	70.84	486276.45
05	J	K	612812.83		612812.83
05	J	L	471322.93		471322.93
05	J	M	702671.87		702671.87

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
05	K	A	371351.71	19685.20	391036.91
05	K	B	520675.67		520675.67
05	K	C	410622.07		410622.07
05	K	D	352386.07	26192.00	378578.07
05	K	E	1466604.53	22906.71	1489511.24
05	K	F	754604.70	89253.68	843858.38
05	K	G	793723.35	152413.51	946136.86
05	K	H	1049506.93	113927.15	1163434.08
05	K	J	490237.07	108608.78	598845.85
05	K	K	672046.98	244825.90	916872.88
05	K	L	217111.45	187174.25	404285.7
05	L	A	380653.93	2695.47	383349.4
05	L	B	669302.94		669302.94
05	L	C	330761.06	28564.87	359325.93
05	L	D	397708.78	54628.00	452336.78
05	L	E	1008004.69	33029.76	1041034.45
05	L	F	517982.84	358248.35	876231.19
05	L	G	336437.16	95438.98	431876.14
05	L	H	277215.25	97592.55	374807.8
05	L	J	941590.69	50621.24	992211.93
05	L	K	515403.88	189695.98	705099.86
05	L	L	929838.41	182686.69	1112525.1
05	L	M	234607.13	35366.40	269973.53
05	L	N	469186.29	141363.98	610550.27
05	M	A	876671.57	71984.19	948655.76
05	M	B	901958.61	9833.87	911792.48
05	M	C	338089.28		338089.28
05	M	D	541900.92	12284.20	554185.12
05	M	E	758730.76		758730.76
05	M	F	401467.50	2441.70	403909.2
05	M	G	531555.25		531555.25
05	M	H	471278.98		471278.98
05	M	J	278670.99		278670.99
05	N	A	311272.36		311272.36
05	N	B	737002.65		737002.65
05	N	C	599650.91		599650.91
05	N	D	379250.50		379250.5
05	N	E	387570.25		387570.25
05	N	F	779285.72		779285.72
05	N	G	654820.99	16516.09	671337.08
05	O	A	240212.89	3226.07	243438.96
05	O	B	298648.58		298648.58
05	O	C	314524.27		314524.27
05	O	D	230123.35		230123.35
05	O	E	314564.88		314564.88
05	O	F	396537.00		396537
05	O	G	235152.65		235152.65
05	O	H	166582.87		166582.87
05	O	J	362437.39	7072.07	369509.46
05	P	A	808431.00	70875.38	879306.38
05	P	B	1636555.10	184314.39	1820869.49
05	P	C	174552.41		174552.41
05	P	D	854392.34	360705.41	1215097.75

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
05	P	E	266340.06	34877.12	301217.18
05	P	F	400256.96	43876.89	444133.85
05	P	G	190825.36	218.40	191043.76
05	P	H	444288.10	8293.19	452581.29
05	P	J	148156.96	42.24	148199.2
05	Q	A	1298675.90	129264.39	1427940.29
05	Q	B	1061574.69	182836.95	1244411.64
05	Q	C	680318.46	111601.87	791920.33
05	Q	D	782028.45	74251.31	856279.76
05	Q	E	783594.12	98444.17	882038.29
05	R	A	674123.72	99777.70	773901.42
05	R	B	953547.66	51997.12	1005544.78
05	R	C	1505142.17	72178.99	1577321.16
05	R	D	803401.43	133705.17	937106.6
05	R	E	949937.07	229007.21	1178944.28
05	R	F	559098.73	204211.25	763309.98
05	S	A	332093.69	66054.19	398147.88
05	S	B	119378.76	85522.27	204901.03
05	S	C	287786.84	129123.99	416910.83
05	S	D	488061.90	164192.86	652254.76
05	S	E	244798.16	96569.19	341367.35
05	S	F	288730.95	305770.98	594501.93
05	S	G	261989.30	436235.99	698225.29
05	S	H	346544.00	454298.15	800842.15
05	T	A	311610.37	34106.52	345716.89
05	T	B	459600.43	22465.78	482066.21
05	T	C	337880.18	24457.29	362337.47
05	T	D	383517.43	51775.68	435293.11
05	T	E	686696.99	32966.51	719663.5
05	T	F	898484.04	56786.86	955270.9
05	T	G	898924.60	22766.53	921691.13
05	U	A	540295.19	11741.71	552036.9
05	U	B	497001.95	153881.95	650883.9
05	U	C	356127.06		356127.06
05	U	D	734902.91	167683.79	902586.7
05	U	E	403402.24	46893.87	450296.11
05	U	F	756984.24	65277.73	822261.97
05	U	G	316085.09	9814.01	325899.1
05	U	H	795451.96		795451.96
06	A	A	498324.77	2920.90	501245.67
06	A	B	479560.97	12529.23	492090.2
06	A	C	399994.74	14966.83	414961.57
06	A	D	1216439.32	13153.85	1229593.17
06	A	E	572785.43	22859.09	595644.52
06	A	F	1012924.14	95423.74	1108347.88
06	A	G	449791.30	98318.65	548109.95
06	B	A	1836885.03	301037.58	2137922.61
06	B	B	1036771.66	120555.85	1157327.51
06	B	C	629967.53	19985.28	649952.81
06	B	D	501163.73	4760.23	505923.96
06	C	A	635878.90	96909.64	732788.54
06	C	B	640172.74	173607.82	813780.56

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
06	C	C	624919.24	46708.82	671628.06
06	C	D	1770374.54	170009.66	1940384.2
06	C	E	384524.58	30896.22	415420.8
06	D	A	2150654.61	344897.51	2495552.12
06	D	B	1582268.44	685484.01	2267752.45
06	D	C	1069769.05	65924.92	1135693.97
06	D	D	597052.59	12780.65	609833.24
06	E	A	1832332.08	222734.46	2055066.54
06	E	B	1632442.65	182802.73	1815245.38
06	E	C	1021632.19	246973.59	1268605.78
06	F	A	858033.16	113192.97	971226.13
06	F	B	838755.05	32769.53	871524.58
06	F	C	932662.15	33668.63	966330.78
06	F	D	1063994.78	11101.65	1075096.43
06	F	E	1602207.87		1602207.87
06	G	A	1532501.06	96807.36	1629308.42
06	G	B	1702958.21	143237.56	1846195.77
06	G	C	1461319.06	49165.28	1510484.34
06	G	D	1458406.81	105042.54	1563449.35
06	G	E	1029350.51	13895.80	1043246.31
06	H	A	2484317.81	359938.29	2844256.1
06	H	B	1117471.46	37459.33	1154930.79
06	H	C	949545.55	3719.77	953265.32
06	H	D	1704903.86	155557.72	1860461.58
06	H	E	632230.07	48686.27	680916.34
06	J	A	2127043.65	266389.05	2393432.7
06	J	B	2282056.53	41786.83	2323843.36
06	J	C	1317563.38	42440.85	1360004.23
06	K	A	2398956.88	188447.16	2587404.04
06	K	B	1985161.44	330357.03	2315518.47
06	K	C	1640931.00	522259.12	2163190.12
06	L	A	2093646.07	321322.26	2414968.33
06	L	B	1660432.00	152531.05	1812963.05
06	L	C	2667984.25	485937.17	3153921.42
06	M	A	2680867.13	441303.12	3122170.25
06	M	B	2024959.08	93114.37	2118073.45
06	M	C	1639690.43	98279.87	1737970.3
06	N	A	2307050.97	92915.36	2399966.33
06	N	B	2413730.57	200697.60	2614428.17
06	N	C	1058282.39	41978.92	1100261.31
06	O	A	3437972.35	40294.60	3478266.95
06	O	B	1515130.17	31026.49	1546156.66
06	O	C	2739757.44	30779.70	2770537.14
06	P	A	6789013.32	64605.91	6853619.23
07	A	B	164798.36		164798.36
07	A	C	560409.14		560409.14
07	A	D	231990.38		231990.38
07	A	E	294662.62		294662.62
07	A	F	485669.38		485669.38
07	A	G	475779.74		475779.74
07	A	H	482772.34		482772.34
07	B	A	436974.49		436974.49
07	B	B	615426.51	8570.78	623997.29

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
07	B	C	381266.40		381266.4
07	B	D	301239.11		301239.11
07	B	E	302805.19		302805.19
07	B	F	677692.34	5730.48	683422.82
07	B	G	132714.40	72199.65	204914.05
07	B	H	140784.17	14371.22	155155.39
07	B	J	308771.11	23892.50	332663.61
07	B	K	658440.34	4062.36	662502.7
07	C	A	840545.95	32066.64	872612.59
07	C	B	1024302.84	17633.52	1041936.36
07	C	C	617823.36		617823.36
07	C	D	1729514.18	46825.46	1776339.64
07	C	E	1306249.45	38513.63	1344763.08
07	D	A	924116.53	7479.09	931595.62
07	D	B	546016.33	230.22	546246.55
07	D	C	608867.04		608867.04
07	D	D	833408.49	12762.54	846171.03
07	E	A	2413921.67	27487.28	2441408.95
07	E	B	854282.55	81731.48	936014.03
07	E	C	1152824.17	12109.56	1164933.73
07	E	D	695448.01	15587.77	711035.78
07	E	E	1237902.60	44042.88	1281945.48
07	E	F	648493.75	32078.05	680571.8
07	F	A	1198593.60		1198593.6
07	F	B	1539465.52		1539465.52
07	F	C	1567978.27		1567978.27
07	F	D	2359613.56		2359613.56
07	G	A	584407.60		584407.6
07	G	B	719735.43		719735.43
07	G	C	715225.62		715225.62
07	G	D	308947.68		308947.68
07	G	E	424285.37		424285.37
07	G	F	540685.85		540685.85
07	G	G	823892.18		823892.18
07	G	H	481832.93	9564.95	491397.88
07	G	J	503330.25		503330.25
07	H	A	741853.23	9217.35	751070.58
07	H	B	451556.69		451556.69
07	H	C	1217588.61		1217588.61
07	H	D	150502.43		150502.43
07	H	E	647072.70	4078.39	651151.09
07	H	F	365554.56		365554.56
07	J	A	1082798.64	63756.03	1146554.67
07	J	B	1279538.90	17915.72	1297454.62
07	J	C	686853.65	4060.05	690913.7
07	J	D	778680.86		778680.86
07	J	E	641046.40	14.92	641061.32
07	J	F	1282713.09	24174.96	1306888.05
07	K	A	496772.74	16278.24	513050.98
07	K	B	377004.55		377004.55
07	K	C	581274.91	17835.24	599110.15
07	K	D	805481.48		805481.48

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
07	K	E	445444.61		445444.61
07	K	F	734759.51	170622.17	905381.68
07	L	A	419688.60	64404.44	484093.04
07	L	B	385237.89	35189.25	420427.14
07	L	C	1811143.19	186331.93	1997475.12
07	L	D	991065.17	222398.59	1213463.76
07	L	E	1740663.89	182461.69	1923125.58
07	M	A	1454880.47	215060.93	1669941.4
07	M	B	1107113.56	102914.89	1210028.45
07	M	C	340949.05	245568.27	586517.32
07	M	D	295126.78	255161.17	550287.95
07	N	A	574511.43	24414.00	598925.43
07	N	B	598424.94	28809.85	627234.79
07	N	C	406521.75	277461.12	683982.87
07	O	A	2116106.60	22626.87	2138733.47
07	O	B	1900092.58	1635.97	1901728.55
07	O	C	1121577.70		1121577.7
07	P	A	1429166.59	316810.92	1745977.51
07	P	B	1415454.79	165769.92	1581224.71
07	P	C	551542.84	1437.88	552980.72
07	Q	A	1071931.05	395122.34	1467053.39
07	Q	B	1593167.35	401540.17	1994707.52
07	Q	C	2580701.07	80546.29	2661247.36
07	Q	D	2170055.12	187260.61	2357315.73
07	R	A	747309.58	198089.12	945398.7
07	R	B	271808.45	18089.77	289898.22
07	R	C	984892.56	211688.14	1196580.7
07	R	D	235754.53	57803.73	293558.26
07	S	A	2453040.99	133511.80	2586552.79
07	S	B	1854207.80	194270.91	2048478.71
07	S	C	2303080.41	470569.13	2773649.54
07	T	A	1329553.80	275353.06	1604906.86
07	T	B	888260.84	102051.96	990312.8
07	U	A	754503.91	410116.20	1164620.11
07	U	B	571402.34	479781.17	1051183.51
07	U	C	1546766.18	99700.01	1646466.19
08	A	A	858542.17	32893.37	891435.54
08	A	B	1184886.36		1184886.36
08	A	C	687016.54		687016.54
08	A	D	441500.42	316911.22	758411.64
08	B	A	1019863.85		1019863.85
08	B	B	666422.50		666422.5
08	B	C	269077.47		269077.47
08	B	E	183059.38		183059.38
08	B	F	104576.62		104576.62
08	C	A	1122806.95		1122806.95
08	C	B	842603.87		842603.87
08	C	C	363787.29		363787.29
08	C	D	353899.93		353899.93
08	C	E	906648.72		906648.72
08	C	F	505606.43		505606.43
08	C	G	946146.13		946146.13

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
08	D	A	1335784.88		1335784.88
08	D	B	1041986.88		1041986.88
08	D	C	264235.60		264235.6
08	D	D	206088.19		206088.19
08	E	A	890783.62		890783.62
08	E	B	640035.29		640035.29
08	E	C	991649.10	53842.98	1045492.08
08	E	D	415317.85	18217.85	433535.7
08	E	E	761349.15		761349.15
08	E	F	746948.21		746948.21
08	E	G	1125245.65		1125245.65
08	F	A	907202.70	10964.71	918167.41
08	F	B	766458.39	7456.31	773914.7
08	F	C	1062396.03		1062396.03
08	F	D	1024643.16	18573.62	1043216.78
08	F	E	674592.86	16822.57	691415.43
08	F	F	469853.24		469853.24
08	F	G	490793.77		490793.77
08	G	A	606697.77		606697.77
08	G	B	533706.86	25211.49	558918.35
08	G	C	389008.83		389008.83
08	G	D	918556.67	6254.05	924810.72
08	G	E	581856.49		581856.49
08	G	F	1253073.92	18537.29	1271611.21
08	H	A	485156.17		485156.17
08	H	B	925418.25	7022.49	932440.74
08	H	C	381339.77		381339.77
08	H	D	502272.67	4580.62	506853.29
08	H	E	487775.08		487775.08
08	H	F	633534.78	10168.18	643702.96
08	J	A	1567442.55	152889.13	1720331.68
08	J	B	618664.97	47488.95	666153.92
08	J	C	749396.17	9733.83	759130
08	J	D	578185.44	30254.73	608440.17
08	J	E	836561.19	73917.29	910478.48
08	K	A	1443058.20		1443058.2
08	K	B	714123.14		714123.14
08	K	C	461576.88	7442.73	469019.61
08	K	D	648241.40		648241.4
08	K	E	992235.04		992235.04
08	K	F	394058.30		394058.3
08	K	G	788031.61		788031.61
08	K	H	1105148.92	60783.79	1165932.71
08	L	A	1015619.20	33405.70	1049024.9
08	L	B	1015291.87	41.39	1015333.26
08	L	C	530982.16		530982.16
08	L	D	340847.69	17728.64	358576.33
08	L	E	820400.65	41927.34	862327.99
08	L	F	1018013.60	8785.82	1026799.42
08	L	G	721946.78		721946.78
08	M	A	666842.01	21861.92	688703.93
08	M	B	1289226.86		1289226.86

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
08	M	C	629779.74		629779.74
08	M	D	748524.79		748524.79
08	M	E	686808.78		686808.78
08	M	F	798491.42		798491.42
08	M	G	817314.41	26068.66	843383.07
08	M	H	607177.31		607177.31
08	N	A	826457.98		826457.98
08	N	B	768118.57	8604.53	776723.1
08	N	C	450447.21		450447.21
08	N	D	769122.65		769122.65
08	N	E	1059236.61	29078.02	1088314.63
08	N	F	555054.55		555054.55
08	N	G	1074727.87		1074727.87
08	N	H	1210639.44	44389.47	1255028.91
08	N	J	468178.62	12.26	468190.88
08	N	K	421875.64		421875.64
08	N	L	743301.52		743301.52
08	N	M	747068.73	32668.68	779737.41
08	N	N	832032.09		832032.09
08	N	P	157736.19		157736.19
08	O	A	638118.02		638118.02
08	O	B	326131.24		326131.24
08	P	A	1594512.75		1594512.75
09	A	A	1495263.44	130211.40	1625474.84
09	A	B	652159.86	37120.24	689280.1
09	A	C	838276.46	19818.49	858094.95
09	A	D	1163716.68	9094.29	1172810.97
09	A	E	1833580.78	51860.86	1885441.64
09	A	F	543114.07		543114.07
09	A	G	677957.92		677957.92
09	A	H	2009827.20	14847.56	2024674.76
09	B	A	1852869.24		1852869.24
09	B	B	1374604.26		1374604.26
09	B	C	1777146.94	10362.45	1787509.39
09	C	A	2621098.10	45991.75	2667089.85
09	C	B	739638.70		739638.7
09	C	C	503582.91		503582.91
09	C	D	526230.08		526230.08
09	D	A	1406128.47		1406128.47
09	D	B	1367185.69		1367185.69
09	D	C	684074.05	19406.97	703481.02
09	D	D	1637510.72	9848.63	1647359.35
09	E	A	810527.31		810527.31
09	E	B	1254416.76		1254416.76
09	E	C	124735.12		124735.12
09	E	D	789115.51		789115.51
09	E	E	393181.32		393181.32
09	F	A	2382443.75		2382443.75
09	F	B	1645841.58		1645841.58
09	F	C	1241610.06		1241610.06
09	F	D	529689.16		529689.16
09	H	A	2867365.69		2867365.69

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
10	A	B	1239792.15	34961.66	1274753.81
10	A	C	1464042.59		1464042.59
10	A	D	1002390.27		1002390.27
10	B	A	715654.71		715654.71
10	B	B	1544454.70		1544454.7
10	B	C	955437.12		955437.12
10	B	D	1120346.05	143.62	1120489.67
10	B	E	3053686.77	10806.28	3064493.05
10	C	A	797492.83		797492.83
10	C	B	1109367.80		1109367.8
10	C	C	487023.32		487023.32
10	C	D	2012968.96		2012968.96
10	C	E	414170.05		414170.05
10	C	F	671172.05	337.03	671509.08
10	D	A	2278089.25	46554.26	2324643.51
10	D	B	737866.30	24115.56	761981.86
10	E	A	845250.84		845250.84
10	E	B	1822563.00		1822563
10	E	C	921093.72		921093.72
10	E	D	1879115.07	51209.75	1930324.82
10	F	A	888859.16	61298.82	950157.98
10	F	B	1976986.34	87867.41	2064853.75
10	F	C	2142036.42	35237.93	2177274.35
10	G	A	989539.25		989539.25
10	G	B	2533232.50	114580.22	2647812.72
10	G	C	701401.47	33669.81	735071.28
10	G	D	1390231.94	11366.78	1401598.72
10	H	A	2515725.45	25796.52	2541521.97
10	H	B	2599159.44	15567.90	2614727.34
10	H	C	1647665.96	52363.52	1700029.48
10	J	A	3351548.87	649011.98	4000560.85
10	J	B	3008474.97	877781.23	3886256.2
10	J	C	1236592.02	246088.14	1482680.16
10	J	D	2721999.77	1183628.70	3905628.47
10	J	E	1735258.15	749491.33	2484749.48
10	K	A	769320.39	74192.11	843512.5
10	K	B	908553.03	164.36	908717.39
10	K	C	1464114.82	219.05	1464333.87
10	K	D	1447205.42	33656.20	1480861.62
10	L	A	2270589.00	14387.48	2284976.48
10	L	B	2340468.61	148206.73	2488675.34
10	L	C	1073157.03	117942.40	1191099.43
10	L	D	1491299.14	21208.57	1512507.71
10	M	A	3708097.30		3708097.3
10	M	B	2121520.53		2121520.53
10	M	C	3057876.37	41251.95	3099128.32
10	M	D	1666583.89		1666583.89
10	N	A	2108355.15	10251.55	2118606.7
10	N	B	3060021.45	303143.34	3363164.79
10	N	D	1754994.05	75954.34	1830948.39
10	O	A	3255748.64	47131.98	3302880.62
10	O	B	2796095.81	8338.45	2804434.26
10	O	C	2022528.00	84869.94	2107397.94

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
10	P	A	905812.93	154793.22	1060606.15
10	P	B	1357749.15	166356.90	1524106.05
10	P	C	2811007.45	180040.14	2991047.59
10	Q	A	1962538.76	55104.04	2017642.8
10	Q	B	1647634.49		1647634.49
10	Q	C	3987013.61	59091.68	4046105.29
10	Q	D	4635566.31	31418.11	4666984.42
10	R	A	5073194.58	161813.34	5235007.92
10	R	C	5186111.98	144289.45	5330401.43
10	R	E	4382529.55	331383.26	4713912.81
10	S	A	3211425.31	45799.23	3257224.54
10	S	B	6148075.84	133404.20	6281480.04
10	S	C	2608398.12		2608398.12
10	S	D	3777708.50	49723.17	3827431.67
10	T	A	2793980.58		2793980.58
10	T	B	3287172.67	16415.27	3303587.94
10	T	C	3640608.95		3640608.95
10	T	D	2832381.59	81315.18	2913696.77
10	T	E	4120932.45	87494.09	4208426.54
10	T	F	6050191.59	323386.42	6373578.01
10	T	G	2913333.53	29131.55	2942465.08
10	T	H	2515110.69	24107.22	2539217.91
10	T	J	1466349.79	10406.21	1476756
10	T	K	1614274.77	21594.88	1635869.65
10	T	L	1848240.77	21028.38	1869269.15
10	T	M	1325379.29		1325379.29
10	T	N	1134026.06	37631.72	1171657.78
10	U	A	2463965.97	7803.48	2471769.45
10	U	B	4338535.57	74708.85	4413244.42
10	U	C	4160514.65	22684.42	4183199.07
10	U	D	6225917.42	84922.29	6310839.71
10	U	E	2000331.25		2000331.25
10	U	F	3377755.39	8309.51	3386064.9
10	U	G	3544161.12	42150.89	3586312.01
10	U	H	2522022.12		2522022.12
10	U	J	4540056.09	22776.65	4562832.74
10	U	K	1304796.36	64894.32	1369690.68
10	U	L	6269203.02	424573.85	6693776.87
10	U	M	7145352.85	122200.49	7267553.34
10	U	N	3759861.60	135237.71	3895099.31
10	U	O	1132052.71	3401.22	1135453.93
10	V	A	1757844.38		1757844.38
10	V	B	4334171.82		4334171.82
10	V	C	2932128.85		2932128.85
10	V	D	3361947.78	2059.45	3364007.23
10	V	E	2313153.26		2313153.26
10	V	F	5402963.44		5402963.44
10	V	G	6170626.12	5251.74	6175877.86
10	V	H	4013494.30	3482.06	4016976.36
10	V	J	2564855.12	12427.91	2577283.03
10	V	K	4053932.95	55787.00	4109719.95
10	V	L	1034253.26		1034253.26
10	V	M	1649357.18		1649357.18

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
11	A	A	562981.93		562981.93
11	A	B	508493.28		508493.28
11	A	C	547441.28		547441.28
11	A	D	376010.99		376010.99
11	A	E	421569.61	3751.25	425320.86
11	A	F	346707.01	12989.41	359696.42

A P P E N D I X 2

DRAINAGE BASIN PLANIMETRY BY PROVINCE

SCALE = 1:2,000,000



NEWFOUNDLAND

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
02	U	C	25314.4	0	25314.4
02	V	B	34807.08	0	34807.08
02	V	C	285981.62	12034.17	298015.79
02	W	B	638230.44	24432.89	662663.33
02	X	A	1122317.3	12731.49	1135048.79
02	X	B	433808.46	0	433808.46
02	X	C	515077.72	5315.92	520393.64
02	X	D	428222.84	1996.13	430218.97
02	Y	A	175391.93	5717.48	181109.41
02	Y	B	231858.81	0	231858.81
02	Y	C	177930.07	1441.95	179372.02
02	Y	D	210889.35	0	210889.35
02	Y	E	291051.23	17144.17	308195.4
02	Y	F	261779.3	0	261779.3
02	Y	G	239625.65	0	239625.65
02	Y	H	249180.92	2924.01	252104.93
02	Y	J	265289.37	1758.71	267048.08
02	Y	K	401420.36	61807.5	463227.86
02	Y	L	353365.44	1754.28	355119.72
02	Y	M	302915.1	4957.79	307872.89
02	Y	N	541449.08	33359.61	574808.69
02	Y	O	774312	8940.94	783252.94
02	Y	P	283949.34	4010.71	287960.05
02	Y	Q	571757.79	15572.96	587330.75
02	Y	R	486245.17	10919.2	497164.37
02	Y	S	417007.44	9213.71	426221.15
02	Z	A	544908.41	582.33	545490.74
02	Z	B	297209.49	0	297209.49
02	Z	C	409817.45	7354.67	417172.12
02	Z	D	439292.66	21028.32	460320.98
02	Z	E	453548.93	20440.66	473989.59
02	Z	F	470262.29	16218.7	486480.99
02	Z	G	318075.22	0	318075.22
02	Z	H	315667.48	1135.76	316803.24
02	Z	J	306047.06	0	306047.06
02	Z	K	315908.31	0	315908.31
02	Z	L	187634.86	0	187634.86
02	Z	M	279375.27	1106.42	280481.69
02	Z	N	180788.46	0	180788.46
03	L	A	7136.94	0	7136.94
03	L	C	22721.84	3574.64	26296.48
03	L	D	5759.33	0	5759.33
03	M	A	81879.59	9820	91699.59
03	M	B	804.37	0	804.37
03	M	D	89782.33	0	89782.33
03	N	A	698881.29	0	698881.29
03	N	B	928331.83	4611.23	932943.06
03	N	C	699848.52	18105.5	717954.02
03	N	D	841435.49	32694.73	874130.22
03	N	E	1648440.6	51726.65	1700167.25
03	N	F	1536473.25	38173.32	1574646.57
03	N	G	1747620.15	140010.85	1887631

NEWFOUNDLAND (CONTINUED)

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
03	O	A	1642432.46	154522.66	1796955.12
03	O	B	1038824.11	487371.59	1526195.7
03	O	C	1906398.84	305107.15	2211505.99
03	O	D	1173403.38	61901.32	1235304.7
03	O	E	1603832.73	37643.96	1641476.69
03	P	A	386738	361283.16	748021.16
03	P	B	1603967.45	125425	1729392.45
03	P	C	1414314.31	36400.09	1450714.4
03	Q	A	572230.59	4141.88	576372.47
03	Q	B	376523.19	2181.72	378704.91
03	Q	C	3639909.12	73383.98	3713293.1

NOVA SCOTIA

MAINSUB	SUBSUB	LAND	WATER	TOTAL	
01	B	T	1059.31	0	1059.31
01	D	A	63327.63	1788	65115.63
01	D	B	137501.11	0	137501.11
01	D	C	198316.94	0	198316.94
01	D	D	114735.07	0	114735.07
01	D	E	127534.65	0	127534.65
01	D	F	102777.15	0	102777.15
01	D	G	253344.52	1974.69	255319.21
01	D	H	131795.76	0	131795.76
01	D	J	94714.13	0	94714.13
01	D	K	89747.22	0	89747.22
01	D	L	127857.6	0	127857.6
01	D	M	36953.31	0	36953.31
01	D	N	145406.9	0	145406.9
01	D	O	93682.49	0	93682.49
01	D	P	110846.88	0	110846.88
01	D	Q	68383.44	0	68383.44
01	D	R	92433.93	0	92433.93
01	D	S	47617.97	0	47617.97
01	E	A	211822.9	3257.82	215080.72
01	E	B	154892.46	2124.01	157016.47
01	E	C	145111.45	0	145111.45
01	E	D	289254.12	22577.34	311831.46
01	E	E	202026.61	4698.53	206725.14
01	E	F	186908.84	2386.16	189295
01	E	G	106147.04	0	106147.04
01	E	H	102510.09	0	102510.09
01	E	J	105533.02	0	105533.02
01	E	K	151009.32	0	151009.32
01	E	L	116649.73	0	116649.73
01	E	M	91825.74	0	91825.74
01	E	N	126422.84	0	126422.84
01	E	P	69652.39	0	69652.39
01	E	Q	268857.77	0	268857.77
01	E	R	56979.71	0	56979.71
01	F	A	129028.21	0	129028.21
01	F	B	124368.57	5727.66	130096.23
01	F	C	78114.99	0	78114.99
01	F	D	104848.07	0	104848.07
01	F	E	84945.05	0	84945.05
01	F	F	82636.11	0	82636.11
01	F	G	79061.98	0	79061.98
01	F	H	97344.3	1602.71	98947.01
01	F	J	287408.07	5600.09	293008.16
99	9	9	6544.08	0	6544.08

PRINCE EDWARD ISLAND

MAINSUB	SUBSUB	LAND	WATER	TOTAL
01	C A	119228.72	0	119228.72
01	C B	128958.75	0	128958.75
01	C C	112462.45	2575.23	115037.68
01	C D	97163.45	0	97163.45
01	C E	118112.36	0	118112.36

NEW BRUNSWICK

MAINSUB	SUBSUB	LAND	WATER	TOTAL
01	A D	88970.83	0	88970.83
01	A F	352780.53	0	352780.53
01	A G	10424.28	0	10424.28
01	A H	424302.01	3496.64	427798.65
01	A J	230737.93	0	230737.93
01	A K	360442.15	0	360442.15
01	A L	170866.71	0	170866.71
01	A M	212266.69	0	212266.69
01	A N	232918.13	0	232918.13
01	A O	224295.21	0	224295.21
01	A P	586626.28	0	586626.28
01	A Q	330336.95	0	330336.95
01	A R	268154.44	0	268154.44
01	B A	165827.48	0	165827.48
01	B B	110151.45	0	110151.45
01	B C	80767.06	0	80767.06
01	B E	237947.69	0	237947.69
01	B F	4210.4	0	4210.4
01	B J	293270.27	0	293270.27
01	B K	233669.38	0	233669.38
01	B L	354203.45	0	354203.45
01	B M	287282.8	0	287282.8
01	B N	157076.03	0	157076.03
01	B O	398722.15	0	398722.15
01	B Q	209414.91	0	209414.91
01	B R	342036.07	0	342036.07
01	B S	245732.19	0	245732.19
01	B T	140645.15	0	140645.15
01	B U	249053.71	0	249053.71
01	B V	224467.35	0	224467.35
01	D L	39.56	0	39.56
01	D M	1833.31	0	1833.31
02	Q A	3519.06	0	3519.06

QUEBEC			LAND	WATER	TOTAL
MAIN	SUB	SUBSUB			
01	A	A	140026.32	0	140026.32
01	A	B	124395.54	0	124395.54
01	A	D	466345.1	6962.75	473307.85
01	A	F	16819.81	0	16819.81
01	B	B	44219.97	0	44219.97
01	B	C	134175.73	0	134175.73
01	B	D	366872.65	0	366872.65
01	B	F	216789.32	0	216789.32
01	B	G	784996.67	0	784996.67
01	B	H	682587.14	0	682587.14
01	B	J	1716.84	0	1716.84
02	J	A	1003914.37	70423.2	1074337.57
02	J	B	1206119.32	88096.32	1294215.64
02	J	C	82051.26	2424.99	84476.25
02	J	E	819241.83	75110.43	894352.26
02	K	A	190647.96	9625.85	200273.81
02	K	B	0	52.63	52.63
02	K	C	189760.51	10178.31	199938.82
02	K	F	24786.41	6663.61	31450.02
02	K	G	500150.99	5444.52	505595.51
02	K	H	262685.47	4470.24	267155.71
02	K	J	520953.4	16549.57	537502.97
02	L	A	1671.12	1678.23	3349.35
02	L	B	36843.88	8882.09	45725.97
02	L	C	743851.26	2105.21	745956.47
02	L	D	264560.3	6868.2	271428.5
02	L	E	659773.56	15193.06	674966.62
02	L	F	354731.97	10842.15	365574.12
02	L	G	1433831.99	113515.78	1547347.77
02	L	H	865395.57	16017.57	881413.14
02	M	C	77292.04	37366.84	114658.88
02	N	A	1310033.87	155159.3	1465193.17
02	N	B	414785.38	38254.6	453039.98
02	N	C	812721.38	6039.71	818761.09
02	N	D	257638.22	0	257638.22
02	N	E	638252.42	2524.52	640776.94
02	N	F	538880.14	17475.82	556355.96
02	N	G	249200.67	4715.27	253915.94
02	O	A	436542.05	55552.85	492094.9
02	O	B	535332.74	5245.6	540578.34
02	O	C	342165.76	21142.5	363308.26
02	O	D	362243.08	3293.62	365536.7
02	O	E	672194.65	12837.28	685031.93
02	O	F	233580.8	8906.43	242487.23
02	O	G	495393.2	7474.54	502867.74
02	O	H	136284.46	7054.41	143338.87
02	O	J	266994.24	14024.81	281019.05
02	P	A	506583.62	9643.41	516227.03
02	P	B	284181.48	0	284181.48
02	P	C	309384.75	3318.7	312703.45
02	P	D	189885.35	673.13	190558.48

QUEBEC (CONTINUED)

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
02	P	E	304062.3	20964.82	325027.12
02	P	F	313079.4	0	313079.4
02	P	G	296985.08	0	296985.08
02	P	H	397406.22	13488.22	410894.44
02	P	J	695376.44	1017.41	696393.85
02	P	K	205846.97	26352.59	232199.56
02	P	L	270151.36	965.64	271117
02	Q	A	563443.07	0	563443.07
02	Q	B	371472.86	0	371472.86
02	Q	C	396917	0	396917
02	R	A	924051.68	5667.36	929719.04
02	R	B	456005.04	3519.4	459524.44
02	R	C	1440867.98	86387.04	1527255.02
02	R	D	1227900.58	13950.28	1241850.86
02	R	E	954607.48	0	954607.48
02	R	F	1558220.47	26348.8	1584569.27
02	R	G	489310.55	93580.37	582890.92
02	R	H	1470665.65	8284.83	1478950.48
02	S	A	1202341.35	120046.69	1322388.04
02	S	B	627684.34	8066.41	635750.75
02	S	C	772700.32	3782.51	776482.83
02	T	A	1350690.92	72309.18	1423000.1
02	T	B	1562344.95	219293.92	1781638.87
02	T	C	1584179.87	98213.9	1682393.77
02	T	D	945560.99	58084.13	1003645.12
02	T	E	741654.41	96838.47	838492.88
02	U	A	1141515.99	10434.91	1151950.9
02	U	B	698069.16	2580.3	700649.46
02	U	C	2050649.47	65305.14	2115954.61
02	V	A	606448.79	13342.96	619791.75
02	V	B	1542449.47	36107.04	1578556.51
02	V	C	1166944.93	19674.56	1186619.49
02	W	A	1287440.62	40670.12	1328110.74
02	W	B	958522.34	23794.26	982316.6
02	W	C	1491324.6	109887.54	1601212.14
02	W	D	791247.44	0	791247.44
02	X	A	1138857.95	33597.45	1172455.4
02	X	B	796946.01	17990.64	814936.65
02	X	C	459019.62	4667.23	463686.85
02	X	D	55095.52	0	55095.52
03	A	A	1852881.8	132548.74	1985430.54
03	A	B	1220058.75	97203.71	1317262.46
03	A	C	1873637.88	49688.71	1923326.59
03	A	D	1212332.82	55288.37	1267621.19
03	B	A	1462403.49	297200.36	1759603.85
03	B	B	1735084.34	100435.76	1835520.1
03	B	C	1510112.41	37056.95	1547169.36
03	B	D	1100683.77	107271.83	1207955.6
03	B	E	828070.33	78057.88	906128.21
03	C	A	1456276.45	20019.52	1476295.97

QUEBEC (CONTINUED)

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
03	C	B	1332018.57	17299.18	1349317.75
03	C	C	1109952.2	57.69	1110009.89
03	C	D	199143.51	0	199143.51
03	C	E	1103942.21	40061.57	1144003.78
03	D	A	2327098.02	190084.66	2517182.68
03	D	B	1722138.12	51180.05	1773318.17
03	D	C	2684631.8	93637.43	2778269.23
03	D	D	1223183.28	15717.34	1238900.62
03	D	E	755522.6	12364.62	767887.22
03	D	F	474762.36	0	474762.36
03	D	G	402574.5	10677.15	413251.65
03	D	H	1101583.19	108939.78	1210522.97
03	E	A	1084205.15	214510.38	1298715.53
03	E	B	790601.2	0	790601.2
03	E	C	496307.23	5796.92	502104.15
03	E	D	1555947.91	52323.16	1608271.07
03	E	E	2069797.36	63375.94	2133173.3
03	F	A	1096144.31	110549.71	1206694.02
03	F	B	1059639.72	236589.59	1296229.31
03	F	C	1114858.2	142898.89	1257757.09
03	G	A	1394707.17	36751.46	1431458.63
03	G	B	2008625.15	110525	2119150.15
03	G	C	1647632.95	85584.38	1733217.33
03	G	D	2703251.77	220559.8	2923811.57
03	G	E	2178746.46	16259.44	2195005.9
03	H	A	4559557.96	205308.33	4764866.29
03	H	B	996487.26	114682.58	1111169.84
03	H	C	2492147.55	11440.54	2503588.09
03	J	A	1666899.05	174522.72	1841421.77
03	J	B	2158504.87	76351.93	2234856.8
03	J	C	1205598.5	48167.88	1253766.38
03	K	A	841333.21	12377.32	853710.53
03	K	B	2106103.49	46405.65	2152509.14
03	K	C	743123.12	12356.7	755479.82
03	K	D	178762.73	4805.36	183568.09
03	K	E	613855.01	23324.94	637179.95
03	L	A	1866184.3	258135.28	2124319.58
03	L	B	941873.15	73690.88	1015564.03
03	L	C	1272464.93	37111.16	1309576.09
03	L	D	1486823.6	153793.59	1640617.19
03	L	E	2567124.25	88872.02	2655996.27
03	L	F	522962.92	9977.23	532940.15
03	M	A	2565246.99	201806.54	2767053.53
03	M	B	2410086.24	170358.3	2580444.54
03	M	C	950249.27	6974.32	957223.59
03	M	D	3966496.85	115245.1	4081741.95
03	N	A	24939.48	0	24939.48
03	N	B	18024.16	0	18024.16
03	N	D	25119.8	0	25119.8
03	N	E	31536.21	0	31536.21

QUEBEC (CONTINUED)

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
03	N	F	12180.1	913.26	13093.36
03	N	G	13139.75	114.08	13253.83
03	O	A	118310	47322.14	165632.14
03	O	B	38364.39	0	38364.39
03	O	C	13887.15	0	13887.15
03	P	A	1462378.58	0	1462378.58
04	N	B	737169.4	0	737169.4
04	N	C	1082814.24	4243.52	1087057.76

ONTARIO

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
02	A	A	193035.25	91001.59	284036.84
02	A	B	821973.46	50250.05	872223.51
02	A	C	562961.72	953068.51	1516030.23
02	A	D	2018182.71	479318.96	2497501.67
02	A	E	240088.89	255109.45	495198.34
02	B	A	506741.05	474555.28	981296.33
02	B	B	660271.18	16166.36	676437.54
02	B	C	776867.48	408006.3	1184873.78
02	B	D	956038.82	134830.37	1090869.19
02	B	E	551791.94	406591.63	958383.57
02	B	F	505440.15	178194.62	683634.77
02	C	A	333519.82	80400.26	413920.08
02	C	B	533522.12	13448.77	546970.89
02	C	C	357085.78	72152.06	429237.84
02	C	D	257509.52	58519.84	316029.36
02	C	E	874717.91	46365.48	921083.39
02	C	F	655245.59	109042.03	764287.62
02	C	G	300415.38	816778.75	1117194.13
02	D	A	225615.18	17624.39	243239.57
02	D	B	110805.9	0	110805.9
02	D	C	635307.71	54092.03	689399.74
02	D	D	780312.85	110901.1	891213.95
02	E	A	603333.19	534197.77	1137530.96
02	E	B	507494.4	116301.97	623796.37
02	E	C	534874.69	85388.04	620262.73
02	E	D	448759.18	125358.85	574118.03
02	F	A	215933.41	885307.42	1101240.83
02	F	B	180548.13	206521.13	387069.26
02	F	C	399436.03	8462.17	407898.2
02	F	D	134796.31	425901.71	560698.02
02	F	E	266645.29	51302.91	317948.2
02	F	F	304036.4	206008.31	510044.71
02	G	A	474683.77	1803.42	476487.19
02	G	B	200739.83	36176.5	236916.33
02	G	C	396881.15	487304.09	884185.24
02	G	D	308445.15	0	308445.15
02	G	E	247185.81	6303.88	253489.69
02	G	F	85717.84	431966.7	517684.54
02	G	G	381924.87	26008.65	407933.52
02	G	H	183574.1	279255.42	462829.52
02	H	A	260885.71	117328.37	378214.08
02	H	B	207458.02	78794.35	286252.37
02	H	C	268116.93	147002.98	415119.91
02	H	D	159385.72	310373.68	469759.4
02	H	E	109850.03	315453.62	425303.65
02	H	F	322125.92	8785.22	330911.14
02	H	G	95458.47	7261.29	102719.76
02	H	H	286425.9	24758.42	311184.32
02	H	J	155327.47	8779.24	164106.71
02	H	K	373923.05	624.69	374547.74
02	H	L	282198	1180.68	283378.68
02	H	M	293610.36	37066.93	330677.29

ONTARIO			(CONTINUED)			
MAIN	SUB	SUBSUB	LAND		WATER	TOTAL
02	J	C	461819.39		6767.39	468586.78
02	J	D	642131.76		14983.07	657114.83
02	J	E	654010.21		17264.23	671274.44
02	K	A	184464.62		9843.02	194307.64
02	K	B	407202.3		10204.16	417406.46
02	K	C	426059.38		18380.37	444439.75
02	K	D	569047.76		18781.43	587829.19
02	K	E	244798.26		4901.69	249699.95
02	K	F	423735.54		13165.19	436900.73
02	L	A	370282.88		14375.92	384658.8
02	L	B	516825.46		8647.98	525473.44
02	M	A	206422.8		37852.72	244275.52
02	M	B	63003.67		22956.38	85960.05
02	M	C	147371.35		17979.47	165350.82
02	O	A	19.93		0	19.93
03	A	D	88.39		0	88.39
04	A	C	393139.35		0	393139.35
04	A	D	413233.67		39204.05	452437.72
04	A	E	827486.01		17365.38	844851.39
04	B	A	582319.38		0	582319.38
04	B	B	793685.56		0	793685.56
04	B	C	348261.71		1820.35	350082.06
04	C	A	980749.89		131101.89	1111851.78
04	C	B	1484049.8		149856.56	1633906.36
04	C	C	1859014.61		44926.97	1903941.58
04	C	D	1988491.24		60645.79	2049137.03
04	C	E	1260912.73		85060.17	1345972.9
04	D	A	2045490.57		153819.97	2199310.54
04	D	B	2625889.11		51229.12	2677118.23
04	D	C	940800.11		0	940800.11
04	D	D	1138539.32		4281.1	1142820.42
04	E	A	1538910.09		4167.01	1543077.1
04	E	B	495079.51		0	495079.51
04	E	C	1954417.02		9317.89	1963734.91
04	E	D	1181783.26		0	1181783.26
04	F	A	1805528.12		28643.78	1834171.9
04	F	B	966618.31		31674.35	998292.66
04	F	C	1803558.14		21920.37	1825478.51
04	G	A	1346870.6		191766.57	1538637.17
04	G	B	1306964.64		136046.17	1443010.81
04	G	C	833268.74		39821.43	873090.17
04	G	D	1103113.04		24655.8	1127768.84
04	G	E	726196.19		14700.23	740896.42
04	G	F	702681.16		7802.19	710483.35
04	H	A	1810780.68		24522.95	1835303.63
04	H	B	434151.8		0	434151.8
04	H	C	396169.63		0	396169.63
04	H	D	1249522.53		0	1249522.53
04	J	A	358697.05		0	358697.05
04	J	B	527101.41		0	527101.41
04	J	C	881898.13		9341.34	891239.47

ONTARIO (CONTINUED)					
MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
04	J	D	1271077.45	29780.26	1300857.71
04	J	E	454730.51	3498.67	458229.18
04	J	F	1145047.68	25067.39	1170115.07
04	J	G	478300.11	0	478300.11
04	K	A	1522815.96	0	1522815.96
04	L	A	638765.64	20386.95	659152.59
04	L	B	501761.33	0	501761.33
04	L	C	1010263.54	20339.55	1030603.09
04	L	D	290275.15	0	290275.15
04	L	E	414670.15	3239.96	417910.11
04	L	F	452329.81	3035.29	455365.1
04	L	G	664451.92	0	664451.92
04	L	H	460888.87	13802.65	474691.52
04	L	J	474497.83	4446.27	478944.1
04	L	K	620556.01	0	620556.01
04	L	L	530872.24	4657.11	535529.35
04	L	M	287834.21	0	287834.21
04	M	A	399626.74	80173.5	479800.24
04	M	B	309738.07	0	309738.07
04	M	C	355399.2	0	355399.2
04	M	D	424659.94	14848.31	439508.25
04	M	E	954451.01	6357.17	960808.18
04	M	F	737427.38	2669.77	740097.15
04	N	B	500075.21	23587.4	523662.61
04	N	C	1042712.83	0	1042712.83
05	P	A	808431	70875.38	879306.38
05	P	B	1636555.1	184314.39	1820869.49
05	P	C	174552.41	0	174552.41
05	P	D	708137.31	358612.95	1066750.26
05	P	E	261634.69	34877.12	296511.81
05	P	F	20753.23	4440.53	25193.76
05	P	G	24355.47	0	24355.47
05	P	J	84357.39	0	84357.39
05	Q	A	1298675.9	129264.39	1427940.29
05	Q	B	1061574.69	182836.95	1244411.64
05	Q	C	680318.46	111601.87	791920.33
05	Q	D	782028.45	74251.31	856279.76
05	Q	E	783594.12	98444.17	882038.29
05	R	A	52829.93	0	52829.93
05	R	B	450636.67	14338.32	464974.99
05	R	C	1440084.6	62557.29	1502641.89
05	R	D	53846.31	0	53846.31
05	R	E	98784.84	0	98784.84



MANITOBA				LAND	WATER	TOTAL
MAIN	SUB	SUBSUB				
04	A	A	1054710.61	142932.14	1197642.75	
04	A	B	921642.54	1024.42	922666.96	
04	A	C	2333983.16	374614.39	2708597.55	
04	A	D	1594343.14	60125.17	1654468.31	
04	A	E	1007627.61	2208.12	1009835.73	
04	A	F	1597473.5	77212.84	1674686.34	
04	B	C	378960.24	0	378960.24	
04	B	D	1344950.86	0	1344950.86	
04	C	A	283663.7	13903.51	297567.21	
04	C	D	10444.39	0	10444.39	
05	J	M	7362.14	0	7362.14	
05	K	G	184246.78	48131.49	232378.27	
05	K	H	197769.96	31739.7	229509.66	
05	K	J	317520.14	108608.78	426128.92	
05	K	K	672046.98	244825.9	916872.88	
05	K	L	217111.45	187174.25	404285.7	
05	L	C	132305.26	28564.87	160870.13	
05	L	D	249479.88	51630.4	301110.28	
05	L	E	558750.73	33029.76	591780.49	
05	L	F	517982.84	358248.35	876231.19	
05	L	G	336437.16	95438.98	431876.14	
05	L	H	277215.25	97592.55	374807.8	
05	L	J	941590.69	50621.24	992211.93	
05	L	K	515403.88	189695.98	705099.86	
05	L	L	929838.41	182686.69	1112525.1	
05	L	M	234607.13	35366.4	269973.53	
05	L	N	469186.29	141363.98	610550.27	
05	M	D	301558.28	8673.14	310231.42	
05	M	E	506618.94	0	506618.94	
05	M	F	401467.5	2441.7	403909.2	
05	M	G	519782.1	0	519782.1	
05	M	H	471278.98	0	471278.98	
05	M	J	278670.99	0	278670.99	
05	N	F	262419.62	0	262419.62	
05	N	G	640188.26	16516.09	656704.35	
05	O	A	240212.89	3226.07	243438.96	
05	O	B	298648.58	0	298648.58	
05	O	C	314524.27	0	314524.27	
05	O	D	230123.35	0	230123.35	
05	O	E	314564.88	0	314564.88	
05	O	F	396537	0	396537	
05	O	G	235152.65	0	235152.65	
05	O	H	166582.87	0	166582.87	
05	O	J	362437.39	7072.07	369509.46	
05	P	D	146255.03	2092.46	148347.49	
05	P	E	4705.37	0	4705.37	
05	P	F	379503.73	39436.36	418940.09	
05	P	G	166469.89	218.4	166688.29	
05	P	H	444288.1	8293.19	452581.29	
05	P	J	63799.57	42.24	63841.81	
05	R	A	621293.79	99777.7	721071.49	

MANITOBA (CONTINUED)			LAND	WATER	TOTAL
MAIN	SUB	SUBSUB			
05	R	B	502910.99	37658.8	540569.79
05	R	C	65057.57	9621.7	74679.27
05	R	D	749555.12	133705.17	883260.29
05	R	E	851152.23	229007.21	1080159.44
05	R	F	559098.73	204211.25	763309.98
05	S	A	332093.69	66054.19	398147.88
05	S	B	119378.76	85522.27	204901.03
05	S	C	287786.84	129123.99	416910.83
05	S	D	488061.9	164192.86	652254.76
05	S	E	244798.16	96569.19	341367.35
05	S	F	288730.95	305770.98	594501.93
05	S	G	261989.3	436235.99	698225.29
05	S	H	346544	454298.15	800842.15
05	T	A	311610.37	34106.52	345716.89
05	T	B	459600.43	22465.78	482066.21
05	T	C	337880.18	24457.29	362337.47
05	T	D	383517.43	51775.68	435293.11
05	T	E	686696.99	32966.51	719663.5
05	T	F	898484.04	56786.86	955270.9
05	T	G	898924.6	22766.53	921691.13
05	U	A	540295.19	11741.71	552036.9
05	U	B	497001.95	153881.95	650883.9
05	U	C	356127.06	0	356127.06
05	U	D	734902.91	167683.79	902586.7
05	U	E	403402.24	46893.87	450296.11
05	U	F	756984.24	65277.73	822261.97
05	U	G	316085.09	9814.01	325899.1
05	U	H	795451.96	0	795451.96
06	D	A	528136.18	56223.99	584360.17
06	D	B	443333.91	101599.59	544933.5
06	E	A	1087582.55	165516.83	1253099.38
06	E	B	1623029.36	179425.94	1802455.3
06	E	C	1021632.19	246973.59	1268605.78
06	F	A	858033.16	113192.97	971226.13
06	F	B	838755.05	32769.53	871524.58
06	F	C	932662.15	33668.63	966330.78
06	F	D	1063994.78	11101.65	1075096.43
06	F	E	1602207.87	0	1602207.87
06	G	A	1532501.06	96807.36	1629308.42
06	G	B	1702958.21	143237.56	1846195.77
06	G	C	1461319.06	49165.28	1510484.34
06	G	D	1403391.46	99226.05	1502617.51
06	G	E	1029350.51	13895.8	1043246.31
06	H	A	1233852.78	171815.38	1405668.16
06	H	B	17273.41	0	17273.41
06	H	C	490180.66	3719.77	493900.43
06	L	A	81294.36	0	81294.36

SASKATCHEWAN

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
05	A	H	51669.74	0	51669.74
05	A	K	54260.52	0	54260.52
05	E	F	484484.95	0	484484.95
05	E	G	863238.03	27125.08	890363.11
05	F	E	52376.02	0	52376.02
05	F	F	392790.34	0	392790.34
05	G	A	391237.71	14846.28	406083.99
05	G	B	874281.13	3134.26	877415.39
05	G	C	1063429.37	4239.41	1067668.78
05	G	D	599821.58	8675.67	608497.25
05	G	E	306256.86	5.73	306262.59
05	G	F	539340.49	0	539340.49
05	G	G	329153.41	0	329153.41
05	H	A	656801.65	9014.82	665816.47
05	H	B	645470.24	0	645470.24
05	H	C	853833.05	20283.74	874116.79
05	H	D	419157.72	4160.01	423317.73
05	H	E	252202.64	22804.65	275007.29
05	H	F	776034.73	27476.67	803511.4
05	H	G	969413.27	0	969413.27
05	H	H	843337.33	5108.35	848445.68
05	J	A	576950.23	5633.48	582583.71
05	J	B	448578.97	0	448578.97
05	J	C	540213.51	6006.91	546220.42
05	J	D	681980.24	34985.3	716965.54
05	J	E	582217.87	0	582217.87
05	J	F	495049.05	0	495049.05
05	J	G	758019.91	2335.38	760355.29
05	J	H	657731.79	27988.87	685720.66
05	J	J	486205.61	70.84	486276.45
05	J	K	612812.83	0	612812.83
05	J	L	471322.93	0	471322.93
05	J	M	695309.73	0	695309.73
05	K	A	371351.71	19685.2	391036.91
05	K	B	520675.67	0	520675.67
05	K	C	410622.07	0	410622.07
05	K	D	352386.07	26192	378578.07
05	K	E	1466604.53	22906.71	1489511.24
05	K	F	754604.7	89253.68	843858.38
05	K	G	609476.57	104282.02	713758.59
05	K	H	851736.97	82187.45	933924.42
05	K	J	172716.93	0	172716.93
05	L	A	380653.93	2695.47	383349.4
05	L	B	669302.94	0	669302.94
05	L	C	198455.8	0	198455.8
05	L	D	148228.9	2997.6	151226.5
05	L	E	449253.96	0	449253.96
05	M	A	876671.57	71984.19	948655.76
05	M	B	901958.61	9833.87	911792.48
05	M	C	338089.28	0	338089.28
05	M	D	240342.64	16764.91	257107.55
05	M	E	252111.82	0	252111.82

SASKATCHEWAN (CONTINUED)

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
05	M	G	11773.15	0	11773.15
05	N	A	311272.36	0	311272.36
05	N	B	737002.65	0	737002.65
05	N	C	599650.91	0	599650.91
05	N	D	379250.5	0	379250.5
05	N	E	387570.25	0	387570.25
05	N	F	516866.1	0	516866.1
05	N	G	14632.73	0	14632.73
06	A	D	1119696.77	0	1119696.77
06	A	E	572785.43	22859.09	595644.52
06	A	F	861079.45	68077.44	929156.89
06	A	G	449791.3	98318.65	548109.95
06	B	A	1770743.64	295636.86	2066380.5
06	B	B	1036771.66	120555.85	1157327.51
06	B	C	629967.53	19985.28	649952.81
06	B	D	501163.73	4760.23	505923.96
06	C	A	635878.9	96909.64	732788.54
06	C	B	640172.74	173607.82	813780.56
06	C	C	624919.24	46708.82	671628.06
06	C	D	1770374.54	170009.66	1940384.2
06	C	E	384524.58	30896.22	415420.8
06	D	A	1622518.43	288673.52	1911191.95
06	D	B	1138934.53	583884.42	1722818.95
06	D	C	1069769.05	65924.92	1135693.97
06	D	D	597052.59	12780.65	609833.24
06	E	A	744749.53	57217.63	801967.16
06	E	B	9413.29	3376.79	12790.08
06	H	A	780660.13	0	780660.13
06	L	A	765808.69	44053.13	809861.82
07	C	D	1385445.89	46825.46	1432271.35
07	C	E	23211.31	0	23211.31
07	D	C	75817.68	0	75817.68
07	D	D	176653.09	0	176653.09
07	L	A	419688.6	64404.44	484093.04
07	L	B	385237.89	35189.25	420427.14
07	L	C	1590624.89	150410.52	1741035.41
07	L	D	991065.17	222398.59	1213463.76
07	L	E	1487244.46	148249.06	1635493.52
07	M	A	1200159.24	113545.45	1313704.69
07	M	B	1107113.56	102914.89	1210028.45
07	M	C	340949.05	245568.27	586517.32
07	M	D	87355.46	122628.08	209983.54
07	Q	A	5018.12	0	5018.12
07	Q	C	415608.94	61211.56	476820.5
11	A	A	2855.21	0	2855.21
11	A	B	364221.57	0	364221.57
11	A	C	547441.28	0	547441.28
11	A	D	376010.99	0	376010.99
11	A	E	421569.61	3751.25	425320.86
11	A	F	346707.01	12989.41	359696.42

ALBERTA			LAND	WATER	TOTAL
MAIN	SUB	SUBSUB			
05	A	A	489617.67	0	489617.67
05	A	B	409177.78	0	409177.78
05	A	C	817127.73	0	817127.73
05	A	D	459189.17	0	459189.17
05	A	E	238303.29	0	238303.29
05	A	F	465496.2	12985.63	478481.83
05	A	G	367366.53	0	367366.53
05	A	H	575305.82	0	575305.82
05	A	J	314920.34	0	314920.34
05	A	K	444147.15	0	444147.15
05	B	A	147362.36	0	147362.36
05	B	B	78325.06	0	78325.06
05	B	C	71149.76	0	71149.76
05	B	D	68280.18	0	68280.18
05	B	E	110124.44	0	110124.44
05	B	F	99403.55	0	99403.55
05	B	G	94545.17	0	94545.17
05	B	H	207894.82	0	207894.82
05	B	J	115402.83	0	115402.83
05	B	K	75149.32	0	75149.32
05	B	L	397863.24	0	397863.24
05	B	M	530193.92	0	530193.92
05	B	N	520113.07	11197.05	531310.12
05	C	A	449432.41	0	449432.41
05	C	B	367286.72	0	367286.72
05	C	C	561269.77	14427.12	575696.89
05	C	D	482917.43	11078.19	493995.62
05	C	E	986755.57	0	986755.57
05	C	F	296916.75	21937.68	318854.43
05	C	G	311597.49	0	311597.49
05	C	H	349065.39	0	349065.39
05	C	J	442607.91	0	442607.91
05	C	K	591377.56	0	591377.56
05	D	A	390579.01	0	390579.01
05	D	B	333137.99	0	333137.99
05	D	C	608933.29	0	608933.29
05	D	D	706010.47	0	706010.47
05	D	E	466270.56	7749.25	474019.81
05	D	F	303983.67	0	303983.67
05	E	A	349040.72	0	349040.72
05	E	B	405821.55	20743.45	426565
05	E	C	662861.85	0	662861.85
05	E	D	583830.65	6874.75	590705.4
05	E	E	737981.6	4228.38	742209.98
05	E	F	126034.14	0	126034.14
05	F	A	702257.23	25207.18	727464.41
05	F	B	521208.29	0	521208.29
05	F	C	453190.8	0	453190.8
05	F	D	445203.06	0	445203.06
05	F	E	418406.66	0	418406.66
05	G	A	1600664.69	0	1600664.69
06	A	B	479560.97	12529.23	492090.2

ALBERTA (CONTINUED)

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
06	A	C	399994.74	14966.83	414961.57
06	A	D	96742.55	0	96742.55
06	A	F	151844.69	27346.3	179190.99
06	B	A	836714.59	5400.72	842115.31
07	A	B	164140.17	0	164140.17
07	A	C	560409.14	0	560409.14
07	A	D	231990.38	0	231990.38
07	A	E	294662.62	0	294662.62
07	A	F	485669.38	0	485669.38
07	A	G	475779.74	0	475779.74
07	A	H	482772.34	0	482772.34
07	B	A	436974.49	0	436974.49
07	B	B	615426.51	8570.78	623997.29
07	B	C	381266.4	0	381266.4
07	B	D	301239.11	0	301239.11
07	B	E	302805.19	0	302805.19
07	B	F	677692.34	5730.48	683422.82
07	B	G	132714.4	72199.65	204914.05
07	B	H	140784.17	14371.22	155155.39
07	B	J	308771.11	23892.5	332663.61
07	B	K	658440.34	4062.36	662502.7
07	C	A	840545.95	32066.64	872612.59
07	C	B	1024302.84	17633.52	1041936.36
07	C	C	617823.36	0	617823.36
07	C	D	344068.29	0	344068.29
07	C	E	1283038.14	38513.63	1321551.77
07	D	A	924116.53	7479.09	931595.62
07	D	B	546016.33	230.22	546246.55
07	D	C	533049.36	0	533049.36
07	D	D	656755.4	12762.54	669517.94
07	F	C	158699.55	0	158699.55
07	F	D	1573854.12	0	1573854.12
07	G	A	569247.31	0	569247.31
07	G	B	691426.78	0	691426.78
07	G	C	368670.96	0	368670.96
07	G	D	189810.01	0	189810.01
07	G	E	424285.37	0	424285.37
07	G	F	540685.85	0	540685.85
07	G	G	823892.18	0	823892.18
07	G	H	481832.93	9564.95	491397.88
07	G	J	503330.25	0	503330.25
07	H	A	741853.23	9217.35	751070.58
07	H	B	451556.69	0	451556.69
07	H	C	1217588.61	0	1217588.61
07	H	D	150502.43	0	150502.43
07	H	E	647072.7	4078.39	651151.09
07	H	F	365554.56	0	365554.56
07	J	A	1082798.64	63756.03	1146554.67
07	J	B	1279538.9	17915.72	1297454.62
07	J	C	686853.65	4060.05	690913.7
07	J	D	778680.86	0	778680.86

ALBERTA (CONTINUED)

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
07	J	E	641046.4	14.92	641061.32
07	J	F	1282713.09	24174.96	1306888.05
07	K	A	496772.74	16278.24	513050.98
07	K	B	377004.55	0	377004.55
07	K	C	581274.91	17835.24	599110.15
07	K	D	805481.48	0	805481.48
07	K	E	445444.61	0	445444.61
07	K	F	734759.51	170622.17	905381.68
07	M	A	254721.23	101515.48	356236.71
07	M	D	207771.32	132533.09	340304.41
07	N	A	574511.43	24414	598925.43
07	N	B	537302.04	21698.39	559000.43
07	O	A	1305975.34	13359.95	1319335.29
07	O	B	1581302.34	0	1581302.34
07	O	C	1036276.58	0	1036276.58
07	P	A	744369.36	0	744369.36
07	P	B	454230.95	6478.59	460709.54
07	P	C	478747.64	0	478747.64
07	Q	A	135161.53	61374.46	196535.99
07	Q	C	69549.55	0	69549.55
08	K	A	6082.88	0	6082.88
08	N	B	1409.77	0	1409.77
08	N	C	1608.64	0	1608.64
08	N	F	3563.12	0	3563.12
08	N	K	5189.67	0	5189.67
08	N	P	977.52	0	977.52
10	C	A	1378533.45	0	1378533.45
11	A	B	144271.71	0	144271.71

BRITISH COLUMBIA

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
05	A	A	1900.64	0	1900.64
05	A	D	154.99	0	154.99
05	B	A	4520.89	0	4520.89
05	B	B	410.45	0	410.45
05	B	C	1299.31	0	1299.31
05	B	F	2541.32	0	2541.32
05	B	L	1159.07	0	1159.07
05	D	A	10236.5	0	10236.5
07	A	B	658.19	0	658.19
07	E	A	2413921.67	27487.28	2441408.95
07	E	B	854282.55	81731.48	936014.03
07	E	C	1152824.17	12109.56	1164933.73
07	E	D	695448.01	15587.77	711035.78
07	E	E	1237902.6	44042.88	1281945.48
07	E	F	648493.75	32078.05	680571.8
07	F	A	1198593.6	0	1198593.6
07	F	B	1539465.52	0	1539465.52
07	F	C	1409278.72	0	1409278.72
07	F	D	785759.44	0	785759.44
07	G	A	15160.29	0	15160.29
07	G	B	28308.65	0	28308.65
07	G	C	346554.66	0	346554.66
07	G	D	119137.67	0	119137.67
07	O	A	810131.26	9266.92	819398.18
07	O	C	106556.75	0	106556.75
08	A	B	331718.11	0	331718.11
08	A	C	538627.65	0	538627.65
08	A	D	16532.71	0	16532.71
08	B	A	1019863.85	0	1019863.85
08	B	B	666422.5	0	666422.5
08	B	C	269077.47	0	269077.47
08	B	E	183059.38	0	183059.38
08	B	F	104576.62	0	104576.62
08	C	A	1122806.95	0	1122806.95
08	C	B	842603.87	0	842603.87
08	C	C	363787.29	0	363787.29
08	C	D	353899.93	5110.15	359010.08
08	C	E	906648.72	0	906648.72
08	C	F	505606.43	0	505606.43
08	C	G	946146.13	0	946146.13
08	D	A	1335784.88	0	1335784.88
08	D	B	1041986.88	0	1041986.88
08	D	C	264235.6	0	264235.6
08	D	D	206088.19	0	206088.19
08	E	A	890783.62	0	890783.62
08	E	B	640035.29	0	640035.29
08	E	C	991649.1	53842.98	1045492.08
08	E	D	415317.85	18217.85	433535.7
08	E	E	761349.15	0	761349.15
08	E	F	746948.21	0	746948.21
08	E	G	1125245.65	0	1125245.65
08	F	A	907202.7	10964.71	918167.41

BRITISH COLUMBIA (CONTINUED)

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
08	F	B	766458.39	7456.31	773914.7
08	F	C	1062396.03	0	1062396.03
08	F	D	1024643.16	18573.62	1043216.78
08	F	E	674592.86	16822.57	691415.43
08	F	F	469853.24	0	469853.24
08	F	G	490793.77	0	490793.77
08	G	A	606697.77	0	606697.77
08	G	B	533706.86	25211.49	558918.35
08	G	C	389008.83	0	389008.83
08	G	D	918556.67	6254.05	924810.72
08	G	E	581856.49	0	581856.49
08	G	F	1253073.92	18537.29	1271611.21
08	H	A	485156.17	0	485156.17
08	H	B	925418.25	7022.49	932440.74
08	H	C	381339.77	0	381339.77
08	H	D	502272.67	4580.62	506853.29
08	H	E	487775.08	0	487775.08
08	H	F	633534.78	10168.18	643702.96
08	J	A	1567442.55	152889.13	1720331.68
08	J	B	618664.97	47488.95	666153.92
08	J	C	749396.17	9733.83	759130
08	J	D	578185.44	30254.73	608440.17
08	J	E	836561.19	73917.29	910478.48
08	K	A	1437016.63	0	1437016.63
08	K	B	714123.14	0	714123.14
08	K	C	461576.88	7442.73	469019.61
08	K	D	648241.4	0	648241.4
08	K	E	992235.04	0	992235.04
08	K	F	394058.3	0	394058.3
08	K	G	788031.61	0	788031.61
08	K	H	1105148.92	60783.79	1165932.71
08	L	A	1015619.2	33405.7	1049024.9
08	L	B	1015291.87	41.39	1015333.26
08	L	C	530982.16	0	530982.16
08	L	D	340847.69	17728.64	358576.33
08	L	E	820400.65	41927.34	862327.99
08	L	F	1018013.6	8785.82	1026799.42
08	L	G	721946.78	0	721946.78
08	M	A	666842.01	21861.92	688703.93
08	M	B	1289226.86	0	1289226.86
08	M	C	629779.74	0	629779.74
08	M	D	748524.79	0	748524.79
08	M	E	686808.78	0	686808.78
08	M	F	798491.42	0	798491.42
08	M	G	817314.41	26068.66	843383.07
08	M	H	607177.31	0	607177.31
08	N	A	826416.67	0	826416.67
08	N	B	766708.8	8604.53	775313.33
08	N	C	448838.57	0	448838.57
08	N	D	769122.65	0	769122.65

BRITISH COLUMBIA (CONTINUED)

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
08	N	E	1059236.61	29078.02	1088314.63
08	N	F	551491.43	0	551491.43
08	N	G	1074727.87	0	1074727.87
08	N	H	1210639.44	44389.47	1255028.91
08	N	J	468178.62	12.26	468190.88
08	N	K	416685.97	0	416685.97
08	N	L	743301.52	0	743301.52
08	N	M	747068.73	32668.68	779737.41
08	N	N	832032.09	0	832032.09
08	N	P	156758.67	0	156758.67
08	O	A	638118.02	0	638118.02
08	O	B	326131.24	0	326131.24
08	P	A	1089723.13	0	1089723.13
09	A	A	990473.75	99987.98	1090461.73
09	A	C	129114.05	0	129114.05
09	A	E	1348951.19	24886.96	1373838.15
10	A	A	600386.91	0	600386.91
10	A	C	1464042.59	0	1464042.59
10	A	D	24919.46	0	24919.46
10	B	A	715654.71	0	715654.71
10	B	B	1544454.7	0	1544454.7
10	B	C	84416.72	0	84416.72
10	B	D	267575.22	143.62	267718.84
10	B	E	2802103.44	10806.28	2812909.72
10	C	A	699296.36	0	699296.36
10	C	B	1109367.8	0	1109367.8
10	C	C	487023.32	0	487023.32
10	C	D	2012968.96	0	2012968.96
10	C	E	414170.05	0	414170.05
10	C	F	671172.05	337.03	671509.08
10	D	A	1262287.01	4995.37	1267282.38
10	D	B	211153.9	15322.49	226476.39

YUKON

MAIN	SUB	SUBSUB	LAND	WATER	TOTAL
08	A	A	858542.17	32893.37	891435.54
08	A	B	853168.25	0	853168.25
08	A	C	148388.89	0	148388.89
08	A	D	424967.71	117796.35	542764.06
09	A	A	504789.62	30223.42	535013.04
09	A	B	652159.86	37120.24	689280.1
09	A	C	709162.41	19818.49	728980.9
09	A	D	1163716.68	9094.29	1172810.97
09	A	E	484629.59	26973.9	511603.49
09	A	F	543114.07	0	543114.07
09	A	G	677957.92	0	677957.92
09	A	H	2009827.2	14847.56	2024674.76
09	B	A	1852069.54	0	1852069.54
09	B	B	1374185.17	0	1374185.17
09	B	C	1777146.94	10362.45	1787509.39
09	C	A	2621098.1	45991.75	2667089.85
09	C	B	739638.7	0	739638.7
09	C	C	503582.91	0	503582.91
09	C	D	526230.08	0	526230.08
09	D	A	1402735.58	0	1402735.58
09	D	B	1365800.39	0	1365800.39
09	D	C	684074.05	19406.97	703481.02
09	D	D	1637510.72	9848.63	1647359.35
09	E	A	810527.31	0	810527.31
09	E	B	1254416.76	0	1254416.76
09	E	C	124735.12	0	124735.12
09	E	D	789115.51	0	789115.51
09	E	E	393181.32	0	393181.32
09	F	A	2382443.75	0	2382443.75
09	F	B	1642446.07	0	1642446.07
09	F	C	1241610.06	0	1241610.06
09	F	D	529689.16	0	529689.16
09	H	A	2266978.78	0	2266978.78
10	A	B	1239792.15	34961.66	1274753.81
10	A	D	976558.88	0	976558.88
10	B	C	869470.16	0	869470.16
10	B	D	849505.93	0	849505.93
10	B	E	251583.33	0	251583.33
10	D	B	249791.83	0	249791.83
10	E	A	8696.38	0	8696.38
10	E	B	8301.27	0	8301.27
10	E	C	3316.07	0	3316.07
10	H	A	4532.05	0	4532.05
10	K	C	1507.05	0	1507.05
10	L	A	3723269.14	0	3723269.14
10	M	B	2114094.82	0	2114094.82
10	M	C	1124809.15	12597.38	1137406.53
10	M	D	1666583.89	0	1666583.89

NORTHWEST TERRITORIES

MAIN	SUB	SUBSUB	TOTAL
03	C	C	29129.22
03	E	E	17264.33
03	F	A	3835.13
03	F	B	5404.57
03	G	A	5000.74
03	G	E	14737.85
03	H	A	93046.27
03	J	C	2800.92
03	M	D	20902.53
03	N	A	1050.29
04	D	D	62468.79
06	H	A	1423736.48
06	H	B	1137657.38
06	H	C	459364.89
06	H	D	1860461.58
06	H	E	680916.34
06	J	A	2393432.7
06	J	B	2323843.36
06	J	C	1360004.23
06	K	A	2587404.04
06	K	B	2315518.47
06	K	C	2163190.12
06	L	A	1523812.17
06	L	B	1812963.05
06	L	C	3153921.42
06	M	A	3122170.25
06	M	B	2118073.45
06	M	C	1737970.3
06	N	A	2399966.33
06	N	B	2614428.17
06	N	C	1100261.31
06	O	A	3478266.95
06	O	B	1546156.66
06	O	C	2770537.14
06	P	A	6075693.95
07	L	C	256439.71
07	L	E	287632.06
07	N	B	68234.36
07	N	C	683982.87
07	O	B	320426.21
07	P	A	1001608.15
07	P	B	1120515.17
07	P	C	74233.08
07	Q	A	1307058.17
07	Q	B	1994707.52
07	Q	C	2181284.27
07	Q	D	2357315.73
07	R	A	945398.7
07	R	B	289898.22
07	R	C	1196580.7

NORTHWEST TERRITORIES (CONTINUED)

MAIN	SUB	SUBSUB	TOTAL
07	R	D	293558.26
07	S	A	2586552.79
07	S	B	2048478.71
07	S	C	2773649.54
07	T	A	1604906.86
07	T	B	990312.8
07	U	A	1164620.11
07	U	B	1051183.51
07	U	C	1558803.6
09	B	A	799.7
09	B	B	419.09
09	D	A	3392.89
09	D	B	4780.81
10	A	D	911.93
10	B	C	1550.24
10	B	D	3264.9
10	D	A	295591.98
10	D	B	285713.64
10	E	A	836554.46
10	E	B	1814261.73
10	E	C	917777.65
10	E	D	1930324.82
10	F	A	950157.98
10	F	B	2064853.75
10	F	C	2177274.35
10	G	A	989539.25
10	G	B	2647812.72
10	G	C	735071.28
10	G	D	1401598.72
10	H	A	2536989.92
10	H	B	2614727.34
10	H	C	1700029.48
10	J	A	4000560.85
10	J	B	3886256.2
10	J	C	1482680.16
10	J	D	3905628.47
10	J	E	2484749.48
10	K	A	843512.5
10	K	B	908717.39
10	K	C	1462826.82
10	K	D	1480861.62
10	L	A	2269804.64
10	L	B	2488675.34
10	L	C	1191099.43
10	L	D	1512507.71
10	M	B	7425.71
10	M	C	1961721.79
10	N	A	2118606.7
10	N	B	3363164.79
10	N	D	1830948.39

NORTHWEST TERRITORIES (CONTINUED)

MAIN	SUB	SUBSUB	TOTAL
10	O	A	3302880.62
10	O	B	2804434.26
10	O	C	2107397.94
10	P	A	1060606.15
10	P	B	1524106.05
10	P	C	2991047.59
10	Q	A	2017642.8
10	Q	B	1647634.49
10	Q	C	4046105.29
10	Q	D	4666984.42
10	R	A	5235007.92
10	R	C	5330401.43
10	R	E	4713912.81
10	S	A	3257224.54
10	S	B	6281480.04
10	S	C	2608398.12
10	S	D	3827431.67
10	T	A	2793980.58
10	T	B	3303587.94
10	T	C	3640608.95
10	T	D	2913725.93
10	T	E	4208426.54
10	T	F	6373578.01
10	T	G	2942465.08
10	T	H	2539217.91
10	T	J	1476756
10	T	K	1635869.65
10	T	L	1869269.15
10	T	M	1325379.29
10	T	N	1171657.78
10	U	A	2471769.45
10	U	B	4413244.42
10	U	C	4183199.07
10	U	D	6310839.71
10	U	E	2000331.25
10	U	F	3386064.9
10	U	G	3586312.01
10	U	H	2522022.12
10	U	J	4562832.74
10	U	K	1369690.68
10	U	L	6693776.87
10	U	M	7267553.34
10	U	N	3895099.31
10	U	O	1135453.93
10	V	A	1757844.38
10	V	B	4334171.82
10	V	C	2932128.85
10	V	D	3364007.23
10	V	E	2313153.26
10	V	F	5402963.44
10	V	G	6175877.86

NORTHWEST TERRITORIES (CONTINUED)

MAIN	SUB	SUBSUB	TOTAL
10	V	H	4016976.36
10	V	J	2577283.03
10	V	K	3875395.77
10	V	L	860386.25
10	V	M	1598954.72

A P P E N D I X 3

DRAINAGE BASIN PLANIMETRY FOR EASTERN CANADA

SCALE = 1:1,000,000

BASIN	LAND	WATER	TOTAL
01AA	164696.35		164696.35
01AB	133777.45	1087.26	134864.71
01AD	570683.25	10206.80	580890.05
01AF	396563.65		396563.65
01AG	36543.01		36543.01
01AH	426631.82	5936.22	432568.04
01AJ	262169.97	661.94	262831.91
01AK	349741.88	9263.93	359005.81
01AL	169056.22		169056.22
01AM	202984.71	5174.67	208159.38
01AN	188065.68	1416.77	189482.45
01AO	217389.53	26553.28	243942.81
01AP	588562.75	30056.85	618619.6
01AQ	287914.2	11409.93	299324.13
01AR	304094.58	22046.50	326141.08
01BA	158916.01		158916.01
01BB	157478.32	525.84	158004.16
01BC	233316.26	198.34	233514.6
01BD	377322.69	5709.29	383031.98
01BE	235306.92		235306.92
01BF	213045.99	10795.45	223841.44
01BG	762304.43	13850.48	776154.91
01BH	675442.45	220.02	675662.47
01BJ	331704.97	19486.02	351190.99
01BK	231132.34	633.25	231765.59
01BL	351782.2	4248.10	356030.3
01BM	286697.74	282.14	286979.88
01BN	203862.16		203862.16
01BO	397046.36	7596.58	404642.94
01BP	131782.43	1396.35	133178.78
01BQ	209209.97	655.15	209865.12
01BR	202910.74	2698.42	205609.16
01BS	242180.48	7331.98	249512.46
01BT	145006.51	1026.94	146033.45
01BU	235684.57	6363.46	242048.03
01BV	188387.3	1424.29	189811.59
01CA	123531.21		123531.21
01CB	117339.24		117339.24
01CC	123333.36	187.85	123521.21
01CD	102575.89	133.49	102709.38
01CE	99236.34		99236.34
01DA	70098.08	3109.84	73207.92
01DB	138325.65	5207.12	143532.77
01DC	222229.71	5777.75	228007.46
01DD	125182.64	6391.47	131574.11
01DE	124960.27	7319.13	132279.4
01DF	110207.12	1133.15	111340.27
01DG	253858.27	5298.38	259156.65
01DH	124848.12		124848.12

BASIN	LAND	WATER	TOTAL
01DJ	85073	239.40	85312.4
01DK	83876.96		83876.96
01DL	126850.47	2161.08	129011.55
01DM	52002.53		52002.53
01DN	148151.4	246.67	148398.07
01DO	109961.84	198.57	110160.41
01DP	110133.7		110133.7
01DQ	78561.89		78561.89
01DR	88602.77	257.61	88860.38
01DS	60166.54	197.19	60363.73
01EA	192824.96	15585.78	208410.74
01EB	137256.1	6804.56	144060.66
01EC	137120	5769.65	142889.65
01ED	259577.87	31500.24	291078.11
01EE	188029	14802.23	202831.23
01EF	173620.58	8882.03	182502.61
01EG	91752.55	3559.35	95311.9
01EH	76220.69	7117.42	83338.11
01EJ	93693.75	2334.02	96027.77
01EK	135314	3769.17	139083.17
01EL	106121.98	4991.25	111113.23
01EM	86846.13	5692.16	92538.29
01EN	111692.81	3659.92	115352.73
01EO	161022.6	1596.57	162619.17
01EP	59369.5	366.96	59736.46
01EQ	102738.11	2708.71	105446.82
01ER	49221.33	506.25	49727.58
01FA	117751.74		117751.74
01FB	134608.92	5185.23	139794.15
01FC	88291.34		88291.34
01FD	100302.2		100302.2
01FE	85657.22	2266.80	87924.02
01FF	75868.66	5577.92	81446.58
01FG	75627.9	40069.23	115697.13
01FH	81355.52	34355.86	115711.38
01FJ	282361.75	47426.46	329788.21
02BD	135730.34	17203.44	152933.78
02BE	202764.3	6170.12	208934.42
02BF	180360.04	3975.21	184335.25
02CA	257754.45	77456.64	335211.09
02CB	537227.1	34285.55	571512.65
02CC	344613.18	83423.70	428036.88
02CD	238366.73	84095.06	322461.79
02CE	874914.98	88307.45	963222.43
02CF	617180.36	149196.07	766376.43
02CG	311600.21	833278.60	1144878.81
02DA	205633.86	23436.25	229070.11
02DB	116652.04	2451.11	119103.15
02DC	613485.58	92914.07	706399.65

BASIN	LAND	WATER	TOTAL
02DD	717495.73	160235.80	877731.53
02EA	556854.01	544383.79	1101237.8
02EB	497988.1	142348.78	640336.88
02EC	511704.18	98451.74	610155.92
02ED	433875.07	124988.24	558863.31
02FA	211567.37	484683.95	696251.32
02FB	186362.66	204904.54	391267.2
02FC	349494	10697.05	360191.05
02FD	79692.32	86078.86	165771.18
02GA	34953.32		34953.32
02HC	10848.03		10848.03
02HD	90277.98	2821.12	93099.1
02HE	61818.56	42178.89	103997.45
02HF	295323.74	29371.62	324695.36
02HG	97466.04	7612.10	105078.14
02HH	266445.18	36289.89	302735.07
02HJ	149365.89	13268.68	162634.57
02HK	343523.7	20251.01	363774.71
02HL	281898.01	5593.64	287491.65
02HM	301801.11	37398.20	339199.31
02JA	922470.7	123814.44	1046285.14
02JB	1166743.0	158139.27	1324882.31
02JC	490561.29	18325.30	508886.59
02JD	603262.59	55149.85	658412.44
02JE	1348299.6	181574.27	1529873.89
02KA	434740.58	29071.61	463812.19
02KB	360829.59	29977.34	390806.93
02KC	578324.67	46327.84	624652.51
02KD	574989.04	43939.34	618928.38
02KE	211740.49	12456.27	224196.76
02KF	443387.41	37979.28	481366.69
02KG	493938.04	29986.28	523924.32
02KH	249654.93	16786.13	266441.06
02KJ	392784.43	35769.69	428554.12
02LA	373107.64	25683.72	398791.36
02LB	577602.06	12704.10	590306.16
02LC	753443.14	23016.72	776459.86
02LD	240905.96	18697.79	259603.75
02LE	644151.48	43805.63	687957.11
02LF	341713.84	23017.82	364731.66
02LG	1375631.0	156809.54	1532440.6
02LH	794059.58	61785.15	855844.73
02MA	184567.9	68319.41	252887.31
02MB	81290.92	30988.51	112279.43
02MC	258729.16	49621.05	308350.21
02NA	1098680.0	208447.67	1307127.75
02NB	411300.28	46477.37	457777.65
02NC	777791.9	21864.56	799656.46

BASIN	LAND	WATER	TOTAL
02ND	256781.96	11366.21	268148.17
02NE	623526.15	21655.68	645181.83
02NF	521933.8	27209.92	549143.72
02NG	239983.64	12039.60	252023.24
02OA	439556.29	49488.95	489045.24
02OB	519807.62	11706.99	531514.61
02OC	330781.04	20200.54	350981.58
02OD	358615.08	5786.62	364401.7
02OE	688240.23	23487.15	711727.38
02OF	245062.49	24452.31	269514.8
02OG	483097.21	9950.40	493047.61
02OH	149102.38	7180.60	156282.98
02OJ	260445.2	15246.20	275691.4
02PA	504730.62	17678.16	522408.78
02PB	272080.19	1624.09	273704.28
02PC	308765.13	16345.03	325110.16
02PD	182452.19	7879.06	190331.25
02PE	310523.69	967.39	311491.08
02PF	269863.48	4907.97	274771.45
02PG	318690.49	1981.21	320671.7
02PH	403484.66	656.11	404140.77
02PJ	701183.03	7520.59	708703.62
02PK	232213.47	13508.88	245722.35
02PL	262330.81	1561.57	263892.38
02QA	590997.9	11996.09	602993.99
02QB	387716.52	712.31	388428.83
02QC	443860.07		443860.07
02RA	1276475.3	123477.10	1399952.43
02RB	443348.93	24405.96	467754.89
02RC	947103.97	74521.17	1021625.14
02RD	1203889.1	38733.81	1242622.98
02RE	927617.67	20543.77	948161.44
02RF	1518516.3	81241.96	1599758.31
02RG	474377.17	116884.76	591261.93
02RH	1464618.0	93550.70	1558168.79
02SA	1179006.1	172123.72	1351129.84
02SB	566816.05	36804.59	603620.64
02SC	738565.15	32099.17	770664.32
02TA	1105980.0	35934.39	1141914.48
02TB	1666099.0	115235.20	1781334.29
02TC	1567076.4	121076.73	1688153.13
02TD	944382.04	90307.30	1034689.34
02TE	834314.35	34838.31	869152.66
02UA	1070213.5	58384.51	1128598.06
02UB	673936.43	34362.23	708298.66
02UC	1981382.3	121186.45	2102568.82
02VA	561557.06	23535.24	585092.3
02VB	1514229.3	79429.71	1593659.1
02VC	1376258.0	99752.25	1476010.28

BASIN	LAND	WATER	TOTAL
02WA	1194843.9	97726.47	1292570.38
02WB	1465487.1	111888.12	1577375.24
02WC	1413423.5	184253.16	1597676.74
02WD	795232.55	3363.67	798596.22
02WE	26793.53	169.77	26963.3
02XA	2074980.6	121821.30	2196801.99
02XB	758393.77	49551.87	807945.64
02XC	385353.39	19121.10	404474.49
02XD	383796.35	13958.91	397755.26
02YA	188714.19	17591.54	206305.73
02YB	218425.36	7103.28	225528.64
02YC	175542.03	6468.62	182010.65
02YD	200920.02	9702.18	210622.2
02YE	293631	28374.40	322005.4
02YF	259146.34	4825.61	263971.95
02YG	249315.3	9715.42	259030.72
02YH	242854.63	9895.79	252750.42
02YJ	263224.05	4803.69	268027.74
02YK	408641.53	65170.92	473812.45
02YL	341382.02	13584.59	354966.61
02YM	299072.27	11675.20	310747.47
02YN	532984.18	61477.34	594461.52
02YO	751572.45	49792.89	801365.34
02YP	285432.71	13102.13	298534.84
02YQ	560388.87	39630.03	600018.9
02YR	451795.78	51970.13	503765.91
02YS	386670.41	31652.73	418323.14
02ZA	521587.55	13932.79	535520.34
02ZB	269852.25	3811.79	273664.04
02ZC	365515.52	18499.79	384015.31
02ZD	393214.09	37187.77	430401.86
02ZE	460965.1	43444.29	504409.39
02ZF	424536.85	31655.63	456192.48
02ZG	329527.71	6513.64	336041.35
02ZH	281435.71	13836.35	295272.06
02ZJ	294993.95	10715.93	305709.88
02ZK	300838.41	7143.07	307981.48
02ZL	197013.82	6094.81	203108.63
02ZM	271308.92	14242.66	285551.58
02ZN	160452.37	6271.29	166723.66
03AA	1735403.3	224625.28	1960028.65
03AB	1178877.3	131974.27	1310851.63
03AC	2024807.2	126220.09	2151027.34
03AD	1181560.2	98938.70	1280498.98
03BA	1461892.6	338465.06	1800357.73
03BB	1594960.4	312329.39	1907289.82
03BC	501459.62	80192.81	581652.43
03BD	1041870.0	162324.84	1204194.92
03BE	801637.19	97501.42	899138.61

BASIN	LAND	WATER	TOTAL
03BF	848667.46	25615.65	874283.11
03CA	695751.03	41535.60	737286.63
03CB	433267.89	41611.68	474879.57
03CC	2565.25	190.97	2756.22
03CE	10829.28	560.30	11389.58
03CF	238645.85	3182.35	241828.2
03DA	1679756.3	310230.25	1989986.58
03DB	1161.22		1161.22
03DC	458332.67	50606.95	508939.62
03DD	112889.09	11710.56	124599.65
03EA	1101546.2	174486.64	1276032.93
03FC	80249.58	11012.57	91262.15
03KB	514891.4	39775.04	554666.44
03LA	2281230.3	386803.55	2668033.87
03LB	1313907.1	161360.82	1475267.94
03LC	777152.08	45266.45	822418.53
03LD	585744.88	56192.72	641937.6
03LE	980658.01	33848.31	1014506.32
03MA	1559552.8	204013.57	1763566.44
03MB	784100.98	95083.65	879184.63
03NE	741722.84	78351.22	820074.06
03NF	1545430.3	299355.79	1844786.11
03NG	1445940.4	197118.88	1643059.28
03OA	1720535.2	202231.57	1922766.8
03OB	1089781.8	500576.62	1590358.42
03OC	1891056.2	342738.95	2233795.23
03OD	1175774.0	69635.14	1245409.18
03OE	1563917.2	80622.71	1644539.96
03PA	379045.29	364712.59	743757.88
03PB	1560100.4	184751.44	1744851.89
03PC	224061.97	11863.61	235925.58
03QA	281242.22	9812.76	291054.98
03QC	13665.54	218.34	13883.88
04HA	1351535.1	36086.33	1387621.46
04HB	345171.57	2337.06	347508.63
04HC	14365.28		14365.28
04HD	225332.25	572.53	225904.78
04JA	1472.9		1472.9
04JB	363064.54	1884.99	364949.53
04KA	876089.62	16263.06	892352.68
04LA	604824.51	51440.34	656264.85
04LB	498725.21	3522.17	502247.38
04LC	987902.14	40610.27	1028512.41
04LD	293776.61	2187.42	295964.03
04LE	400540.07	20275.61	420815.68
04LF	457757.07	10071.37	467828.44
04LG	662791.87	26428.69	689220.56
04LH	437999.12	15978.32	453977.44

BASIN	LAND	WATER	TOTAL
04LJ	450301.31	6883.68	457184.99
04LK	568894.53	9778.17	578672.7
04LL	520664.05	11835.27	532499.32
04LM	284510.06	8284.80	292794.86
04MA	772797.25	115463.69	888260.94
04MB	312553.6	4071.76	316625.36
04MC	333131.66	12745.02	345876.68
04MD	420983.91	19164.60	440148.51
04ME	913304.27	42708.98	956013.25
04MF	730341.45	13274.31	743615.76
04NA	1004067.6	36345.39	1040413.07
04NB	1144936.6	16514.79	1161451.39
04NC	2095607.9	76927.78	2172535.7

A P P E N D I X 4

**RESULTS OF THE POINT-POLYGON OVERLAY
USING THE PROVINCIAL POINT FILE FOR QUEBEC
AND
THE CDR-SUB DATA BASE
AT A SCALE OF 1;1,000,000**

Land, water, and total areas are listed in Columns 2, 3, and 4, respectively for each drainage basin by using the available information (CLI coverage) on the CDR-Sub Data Base at a scale of 1:1,000,000.

The provincial point file for Quebec was generated from maps at a scale of 1:50,000. Lake frequency for each drainage basin is listed in Column 5. The number of lakes for which an area was calculated is listed in Column 6. Column 7 indicates the percentage of lakes with a calculated area for each of the 88 drainage basins; the cumulative area is listed in Column 8.

For drainage basins which are completely or partially north of latitude 50, the provincial lake inventory is incomplete. Furthermore, since not all lakes were measured, only 27 of the drainage basins listed provide an area measurement for 95% or more of the lakes counted. Consequently, these 27 drainage basins provide the most accurate estimate of the total area occupied by lakes within the drainage basin. Drainage basins which partly or completely lie north of the fiftieth parallel are listed in Appendix 4A.

The Variation Coefficient (θ) is represented by the following relationship:

$$(\theta) = 100 - \left(\frac{A}{B} \right) \cdot 100$$

Where A is the drainage basin water area as listed for the CDR-Model data base at a scale of 1:1,000,000, and B is the total area of measured lakes for the corresponding drainage basin.

Columns 10 and 11 provide a measure of variation between the water area as measured directly from the original data base and as computed when substituting the total lake area for the water area. This variation coefficient is calculated for the water area only (Column 10) and the total area of the drainage basin (Column 11). When the water area in the data base is smaller than the water area in the point file, the variation coefficient is positive. In some instances, the water area is 0; then the variation coefficient is 100. When the water area is larger than the cumulative lake

area, the variation coefficient is negative. The following table illustrates the range of the variation coefficient.

<u>Water Area is "n" Times the Cumulative Lake Area</u>		<u>Variation Coefficient</u>
0	(no area measured)	100
0.5		50
1	(same area as the cumulative lake area)	0
2		- 100
4		- 300
6		- 500
10		- 900
20		- 1,900
40		- 3,900
50		- 4,900
100		- 9,900
1,000		- 99,000

Drainage basins which are adjacent to large freshwater bodies, thus having an arbitrarily exaggerated value for the water area (2), become evident through the variation coefficient (0) in column 10. Drainage basins along the St. Lawrence River, such as 2MC, 2PK, 20J and others, illustrate well areas where water is exaggerated into the St. Lawrence River and produces a very large negative value, indicating that the shoreline value is much larger than the cumulative lake area. Also, the variation coefficient is consistently negative and relatively large for drainage basins which lie north of 50°N latitude. The shoreline area value is therefore larger than the cumulative lake area. As stated earlier in the appendix, these drainage basins were not completely inventoried and therefore present gaps in the lake area and frequency record.

The shoreline coverage includes rivers. In drainage basins where (1) rivers are large, where (2) the drainage basin is small, and (3) where the lake frequency is low, the variation coefficient will be negative. The magnitude of the variation coefficient depends on the combination and extent of the three variables.

The presence of rivers may be the most important of all three variables. Because rivers are not included in the provincial lake file as used in this study, the total lake water area value for the drainage basin (Column 9) will

often be smaller than the total water area, which includes rivers, of the shoreline coverage (Column 3).

2PC	308755	16337	325092	558	529	94.8	9451	318206	-72.9
2PD	182440	7877	190317	180	180	100	2329	184769	-238.2
2PE	310500	965	311465	387	383	99	4061	314561	76.2
2PF	269852	4934	274786	1057	1056	99.9	10843	280895	54.5
2PG	318684	1979	320663	195	195	96.5	2426	321110	18.4
2PH	403478	654	404132	195	195	100	1659	405137	60.6
2PJ	701158	7515	708673	274	273	99.6	6450	707608	-16.5
2PK	232213	13505	245718	6	6	100	67	232280	-20056.7
2PL	262324	1565	263889	63	62	98.4	1607	263931	2.6
2QA	590978	11955	602933	1015	968	95.4	14368	605346	16.8
2QB	387698	718	388416	392	386	98.5	2328	390026	69.2
2QC	443953	0	443853	661	639	96.7	3080	446943	100
2RA	1276447	123360	1399807	28	23	82.1	70404	1346851	-75.2
2RB	443340	24372	467712	1123	13	1.2	10673	454013	-128.4
2RC	947073	74462	1021535	3409	768	22.5	43766	990839	-70.1
2RD	1203860	38591	1242551	2626	348	13.3	15795	1219655	-145
2RE	927603	20510	948113	2100	390	18.6	25386	952389	19.2
2RF	1518486	81167	1598653	5393	3083	57.2	105988	1624485	23.4
2RG	474361	116865	591226	1256	863	68.7	124952	599313	6.5
2RH	1464543	93515	1558058	6982	5665	81.1	61387	1525930	-52.3
2SA	1178942	171988	1350940	5170	756	14.6	123486	1302408	-39.3
2SB	566802	36760	603562	4208	207	4.9	28944	595746	-27
2SC	738537	32035	770572	4590	2985	65	33825	772362	5.3
2TA	1105954	35910	1141864	43	40	93	24956	1130910	-43.9
2TB	1666048	115154	1781202	522	262	50.2	270470	1936518	57.4
2TC	1567017	12062	687979	2997	416	13.9	86737	1653754	-39.5
2TD	944350	90220	1034570	77	73	94.8	65706	1010056	-37.3
2TE	834287	34787	869074	2546	371	14.6	22597	858884	-53.9
2UA	1070195	58399	1128494	6770	192	2.8	39770	1109965	-46.6
2UB	673915	34310	708225	132	61	46.2	18381	692296	-86.7
2UC	1981564	121063	2102627	216	212	98.1	94230	2075794	-28.5
2VA	561542	23510	585052	60	60	100	19624	581166	-19.8
2VB	1514207	79334	1593541	141	140	99.3	52662	1566889	-50.6
2VC	1376190	99653	1475843	55	55	100	40211	1416401	-147.8
2WA	1194441	97596	1292039	120	120	100	57223	1251664	-70.6
2WB	1465442	111797	1577239	20	20	100	23929	1489371	-367.2
2WC	1413384	184082	1597466	63	63	100	95453	1508837	-92.9
2XA	2074907	121697	2196604	43	43	100	34470	2109377	-253.1
2XB	758368	49572	807940	19	19	100	12945	771313	-282.9
2XC	385340	19123	404463	13	13	100	8643	393983	-121.3
2XD	383777	13975	397752	4	4	100	1918	395695	-628.6

A P P E N D I X 4A

**PORTION OF DRAINAGE BASINS WHICH COMPLETELY LIE
TO THE SOUTH OF 50°N**

20J	260432	15239	275671	58	100	25497	530211	30.8	1.5
2PA	504714	17656	522370	1414	71.3	46896	568823	42	3.5
2PB	272074	1620	273694	781	95.8	8774	280848	81.5	2.5
2PC	308755	16337	325092	529	94.8	9451	318206	-72.9	-2.2
2PD	182440	7877	190317	180	100	2329	184769	-238.2	-3
2PE	310500	965	311465	383	99	4061	314561	76.2	1
2PF	269852	4934	274786	1056	99.9	10843	280695	54.5	2.1
2PG	318684	1979	320663	195	96.5	2426	321110	18.4	0.1
2PH	403478	654	404132	195	100	1659	405137	60.6	0.2
2PJ	701158	7515	708673	273	99.6	6450	707608	-16.5	-0.2
2PK	232213	13505	245718	6	100	67	232280	-20056.7	-5.8
2PL	262324	1565	263889	62	98.4	1607	263931	2.6	0
2QA	590978	11955	602933	968	95.4	14368	605346	16.8	0.4
2QB	387698	718	388416	386	98.5	2328	390026	69.2	0.4
2QC	443853	0	443853	639	96.7	3090	446943	100	0.7
2RG	474361	116865	591226	863	68.7	124952	599313	6.5	1.3
2RH	1464543	93515	1558058	5665	81.1	61387	1525930	-52.3	-2.1
2SB	566802	36760	603562	207	4.9	28944	595746	-27	-1.3
2SC	738537	32035	770572	2985	65	33825	772362	5.3	0.2

A P P E N D I X 5

**AREA-WEIGHTED SURFACE WATER RESOURCES AT RISK
FOR SOUTHERN QUEBEC ACCORDING TO CLASSES OF
POTENTIAL TO REDUCE ACIDITY**

LOW POTENTIAL TO REDUCE ACIDITY

BASIN	LAKES	AREA	BASIN	LAKES	AREA
1AA	135	159944	1DM	0	46630
1AB	40	133605	1DN	0	148147
1AD	388	528130	1DO	0	109958
1AF	20	295253	1DO	0	110130
1AG	0	36535	1DQ	0	78560
1AH	0	373282	1DR	0	88599
1AJ	0	213800	1DS	0	60164
1AK	0	332841	1EA	0	192814
1AL	0	73843	1EB	0	137249
1AM	0	202981	1EC	0	130557
1AN	0	137830	1ED	0	259567
1AO	0	128157	1EE	0	188022
1AP	0	466620	1EF	0	173616
1AQ	0	255292	1EG	0	91748
1AR	0	302068	1EH	0	76217
1BA	0	68221	1EJ	0	93689
1BB	46	80062	1EK	0	135308
1BC	56	98166	1EL	0	106117
1BD	224	303596	1EM	0	86843
1BE	0	90508	1EN	0	111690
1BF	34	200067	1EO	0	161017
1BG	197	548608	1EP	0	59367
1BH	305	434100	1EQ	0	102736
1BJ	0	217586	1ER	0	49217
1BK	0	135944	1FA	0	117747
1BL	0	351771	1FB	0	134606
1BM	0	70161	1FC	0	88290
1BN	0	127465	1FD	0	100300
1BO	0	330074	1FE	0	85651
1BP	0	19093	1FF	0	75867
1BQ	0	41462	1FG	0	75622
1BR	0	202901	1FH	0	81353
1BS	0	242174	1FJ	0	282351
1BT	0	114866	2BD	0	117939
1BU	0	221696	2BE	0	202763
1BV	0	162714	2BF	0	180358
1CA	0	123526	2CA	0	257747
1CB	0	117336	2CB	0	537226
1CC	0	123326	2CC	0	344609
1CD	0	102573	2CD	0	238363
1CE	0	99231	2CE	0	874910
1DA	0	70096	2CF	0	617174
1DB	0	138317	2CG	0	311583
1DC	0	222225	2DA	0	205632
1DD	0	125176	2DB	0	116651
1DE	0	124950	2DC	0	613477
1DF	0	87231	2DD	0	622267
1DG	0	251334	2EA	0	346237
1DH	0	83923	2EB	0	169987
1DJ	0	46234	2EC	0	405656
1DK	0	39476	2ED	0	433871
1DL	0	110876	2FA	0	165540

LOW POTENTIAL (CONTINUED)

BASIN	LAKES	AREA	BASIN	LAKES	AREA
2FB	0	150516	2OH	103	134201
2FC	0	46196	2OJ	43	199733
2GA	0	34952	2PA	1983	504715
2HC	0	10847	2PB	815	272074
2HD	0	90277	2PC	558	308757
2HE	0	61814	2PD	180	182441
2HF	0	185034	2PE	384	287629
2HG	0	97464	2PF	945	243894
2HH	0	266443	2PG	198	256365
2HJ	0	149365	2PH	184	301160
2HK	0	343459	2PJ	253	666806
2HL	0	281896	2PK	6	232213
2HM	0	301795	2PL	62	261718
2JA	5646	918234	2QA	973	523115
2JB	1483	735178	2QB	274	216784
2JC	53	451301	2QC	289	212546
2JD	0	603261	2RA	28	1193612
2JE	4147	1222691	2RB	1122	443341
2KA	1525	434729	2RC	3327	914690
2KB	0	162501	2RD	2585	1181134
2KC	414	534304	2RE	2100	924568
2KD	0	216620	2RF	5226	1482416
2KE	0	211737	2RG	1257	474032
2KF	68	443380	2RH	6478	1274907
2KG	2546	493932	2SA	5169	1164924
2KH	1318	249648	2SB	4210	566802
2KJ	1961	392779	2SC	4589	738537
2LA	14	373105	2TA	43	1099007
2LB	66	565980	2TB	515	1596311
2LC	3188	717005	2TC	2640	1443188
2LD	1231	240899	2TD	76	906353
2LE	2634	644138	2TE	2544	834124
2LF	1771	341704	2UA	6771	1070072
2LG	7346	1375585	2UB	125	637887
2LH	3379	794046	2UC	201	1829002
2MA	0	184557	2VA	49	443062
2MB	0	81286	2VB	113	1297851
2MC	1	172949	2VC	46	1304428
2NA	5362	1098643	2WA	116	1162751
2NB	1903	411290	2WB	19	1452918
2NC	3628	777787	2WC	63	1413384
2ND	991	256773	2WD	0	199
2NE	2691	623514	2XA	43	1650138
2NF	2287	521927	2XB	19	758368
2NG	835	239499	2XC	13	385339
2OA	43	196137	2XD	4	241390
2OB	1542	386424	2YA	0	170179
2OC	1153	278210	2YB	0	150215
2OD	45	344004	2YC	0	126804
2OE	269	660540	2YD	0	185925
2OF	70	226012	2YE	0	154374
2OG	108	335802	2YF	0	259143

LOW POTENTIAL (CONTINUED)

BASIN	LAKES	AREA
2YG	0	249313
2YH	0	115157
2YJ	0	147929
2YK	0	292878
2YL	0	217969
2YM	0	299066
2YN	0	487619
2YO	0	696693
2YP	0	285426
2YQ	0	414914
2YR	0	450713
2YS	0	275550
2ZA	0	512856
2ZB	0	269849
2ZC	0	246312
2ZD	0	223162
2ZE	0	174476
2ZF	0	224654
2ZG	0	329524
2ZH	0	159502
2ZJ	0	294987
2ZK	0	300832
2ZL	0	197013
2ZM	0	271304
2ZN	0	160447
TOTAL	117904	84140825

MODERATE POTENTIAL TO REDUCE ACIDITY

BASIN	LAKES	AREA
1AA	45	49511
1AB	36	124525
1AD	374	517132
1AF	21	259547
1AG	0	36535
1AH	0	120165
1AJ	0	191428
1AK	0	127298
1AL	0	11930
1AN	0	181800
1AO	0	127612
1AP	0	131420
1AQ	0	35572
1AR	0	39327
1BA	0	74888
1BB	46	57162
1BC	73	142835
1BD	233	377313
1BE	0	13972
1BF	35	211570
1BG	236	691693
1BH	430	637784
1BJ	0	26374
1BK	0	109156
1BL	0	147435
1BM	0	11012
1BN	0	128931
1BO	0	179874
1BP	0	52279
1BQ	0	164789
1BR	0	134396
1BS	0	178868
1BV	0	44486
1CC	0	44409
1CD	0	102573
1CE	0	16205
1DB	0	284
1DE	0	5817
1EA	0	72213
1EB	0	55507
1EC	0	76596
1ED	0	88714
1EE	0	31338
1EF	0	65058
1EG	0	61054
1EH	0	49056
1EJ	0	12680
1FB	0	14134
1FC	0	34382
1FD	0	32590
1FE	0	16252
1FF	0	1103

MODERATE POTENTIAL (CONTINUED)

BASIN	LAKES	AREA	BASIN	LAKES	AREA
1FJ	0	1	2RA	4	236025
2BD	0	18521	2RB	584	155960
2BE	0	65859	2RC	2871	536208
2BF	0	32930	2RD	908	215989
2CA	0	0	2RE	6	8454
2CC	0	0	2RF	54	23837
2CD	0	0	2RG	312	108644
2CF	0	0	2RH	4944	977875
2CG	0	277646	2SA	3111	496281
2EB	0	490	2SB	84	7856
2EC	0	54293	2SC	261	29086
2ED	0	335749	2TA	20	490762
2FA	0	202063	2TB	119	1143266
2FB	0	154922	2TC	403	141800
2FC	0	253892	2TD	20	344311
2FD	0	5220	2TE	3	3891
2GA	0	701	2UA	498	97695
2JA	2003	281468	2UB	15	98437
2JB	328	269080	2UC	33	436879
2JC	21	173786	2VA	51	527313
2JD	0	37046	2VB	119	1299593
2JE	29	137124	2VC	36	859065
2KF	36	4402	2WA	12	276847
2LB	0	827	2WB	0	637407
2LF	11	10328	2XA	0	490649
2LG	1277	194688	2XC	0	8844
2LH	521	125961	2XD	0	179849
2NA	300	45582	2YA	0	170179
2NE	35	10732	2YB	0	150215
2NF	1	679	2YC	0	175533
2NG	122	38835	2YD	0	185925
2OB	5	19362	2YE	0	293630
2OC	9	52567	2YF	0	259143
2OD	25	153834	2YG	0	116394
2OE	276	688217	2YH	0	172269
2OF	62	168686	2YJ	0	115292
2OG	102	220844	2YK	0	267907
2OH	103	131469	2YL	0	240192
2OJ	5	37313	2YN	0	118070
2PA	258	59416	2YP	0	9972
2PB	340	75666	2YR	0	31368
2PC	401	150349	2ZA	0	146394
2PD	88	82461	2ZE	0	45738
2PE	136	88222	2ZG	0	43844
2PF	520	122400	2ZK	0	22994
2PG	116	140814	2ZL	0	5246
2PH	170	301682	2ZM	0	28732
2PJ	252	577193	2ZN	0	35072
2PL	37	128860			
2QA	968	526556			
2QB	392	387699			
2QC	661	443853			
			TOTAL	25607	25875804

HIGH POTENTIAL TO REDUCE ACIDITY

BASIN	LAKES	AREA	BASIN	LAKES	AREA
1AA	3	3541	2BD	0	17789
1AD	0	43886	2CA	0	0
1AF	1	238310	2CC	0	0
1AH	0	246940	2CD	0	0
1AJ	0	70740	2CF	0	0
1AK	0	121102	2CG	0	392
1AL	0	95210	2DD	0	95224
1AM	0	140409	2EA	0	210610
1AN	0	50232	2EB	0	327993
1AO	0	103610	2EC	0	106041
1AP	0	174931	2ED	0	7455
1AQ	0	59190	2FA	0	46023
1AR	0	83756	2FB	0	29103
1BA	0	158913	2FC	0	303295
1BB	0	127752	2FD	0	79691
1BC	0	105528	2HC	0	4005
1BE	0	203396	2HD	0	76809
1BF	0	1470	2HE	0	425
1BG	6	11900	2HF	0	110285
1BH	20	14048	2HG	0	3075
1BJ	0	329829	2HH	0	3411
1BK	0	104046	2HJ	0	643
1BL	0	1007	2HK	0	11875
1BM	0	271297	2HM	0	21564
1BN	0	76395	2JB	406	426240
1BO	0	96918	2JC	21	39255
1BP	0	117673	2JE	29	125580
1BQ	0	167745	2KA	1	3075
1BT	0	30135	2KB	0	205256
1BU	0	14016	2KC	197	382167
1BV	0	25969	2KD	0	358367
1CC	0	14	2KE	0	53495
1DB	0	284	2KF	63	293813
1DD	0	13	2KG	6	4932
1DF	0	22974	2KH	3	272
1DG	0	2517	2LA	14	357854
1DH	0	40922	2LB	41	569541
1DJ	0	38837	2LC	109	61015
1DK	0	44396	2LD	66	50170
1DL	0	15971	2LF	64	39938
1DM	0	5370	2LH	271	67746
1EA	0	72213	2MA	0	128366
1EB	0	55507	2MB	0	41393
1EC	0	76596	2MC	54	258710
1ED	0	88714	2NE	42	9326
1FB	0	69340	2NG	33	36086
1FC	0	23768	2OA	159	439538
1FD	0	20569	2OB	83	190554
1FE	0	33922	2OC	32	80950
1FF	0	50413	2OD	30	202416
1FG	0	2333	2OF	32	90997
1FJ	0	1	2OG	52	277370

HIGH POTENTIAL (CONTINUED)

BASIN	LAKES	AREA
2OH	4	32370
2OJ	58	260432
2PA	80	109932
2PB	42	70350
2PC	97	110850
2PD	70	69297
2PE	73	90650
2PF	211	51159
2PG	14	107740
2PH	11	102318
2PK	1	22160
2PL	8	58632
2QA	32	99580
2QB	7	31977
2RC	8	26527
2RD	56	51182
2RE	2	3808
2RF	757	198912
2RG	368	204444
2RH	322	203170
2SB	89	45168
2SC	109	70989
2TC	71	17091
2TE	40	8968
2UA	36	5657
2WD	0	199
2XA	0	96406
2XB	1	64236
2XD	0	49848
2YH	0	70433
2YJ	0	55228
2YL	0	12
2ZA	0	44
2ZB	0	45786
2ZC	0	114852
2ZD	0	222468
2ZE	0	104417
2ZF	0	220218
2ZG	0	33101
2ZH	0	11617
2ZJ	0	169772
2ZK	0	70086
2ZL	0	191767
2ZM	0	94174
2ZN	0	7535

TOTAL	4405	13880260
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ORGANIC TERRAIN

BASIN	LAKES	AREA
1AA	90	110433
1AB	4	9080
1AD	24	21074
1AM	0	25945
1AP	0	8861
1AQ	0	140061
1AR	0	73602
1BG	6	11900
1BH	20	14048
1BK	0	18063
1BL	0	147435
1BO	0	63893
1BQ	0	25602
1CC	0	44395
1CD	0	102573
1CE	0	16205
2BD	0	732
2BE	0	65859
2BF	0	32930
2EC	0	2704
2HF	0	129513
2HH	0	86939
2HK	0	135804
2HL	0	115213
2HM	0	66432
2JA	1428	244382
2JB	208	261286
2KC	0	33349
2KD	0	216620
2KE	0	158242
2KF	0	148506
2LA	0	15251
2LG	144	24963
2NA	1580	360432
2OD	4	16960
2OE	87	215532
2PA	0	42
2PC	0	31
2PD	0	277
2PE	0	348
2PG	82	115347
2PH	70	112251
2PJ	138	397777
2PK	5	210053
2PL	19	75438
2QA	425	264830
2QB	7	31977
2RA	11	412066
2RB	27	26994
2RC	241	104179
2RD	132	167563
2RE	6	13556

ORGANIC TERRAIN (CONTINUED)

BASIN	LAKES	AREA
2RF	520	156657
2RG	7	9226
2RH	90	48596
2SA	259	63832
2SB	89	45562
2SC	24	10854
2TA	3	5252
2TB	4	6620
2TC	82	21065
2TD	21	191624
2TE	105	22772
2UA	210	77408
2UB	7	27768
2UC	10	146648
2VA	1	23861
2VB	0	44853
2VC	15	408259
2WA	16	202504
2WB	2	57946
2WC	3	83950
2XA	11	357075
2XB	1	183443
2XC	1	25346
2XD	0	25627
2YH	0	187857
2YJ	0	263221
2YK	0	118892
2YL	0	123419
2ZA	0	179261
TOTAL	6239	8216946

A P P E N D I X 6

LAKE SIZE FREQUENCY DISTRIBUTION

BY

DRAINAGE BASIN SUB-SUBDIVISION

AREA CODE	No area 0.25-10 Ha											TOTAL % W/AREA	% < 10Ha	
	1	2	3	4	5	6	7	8	9	10	11			
1AA	1	116	7	3	1	1	1				3	133	99	87
1AB	1	32	3	2		1						40	98	80
1AD	26	297	20	6	5	4	2				11	377	93	79
1AF	3	14	2					3				20	85	70
1BB	1	34	2	4	2			1				44	98	77
1BC	1	63	1	3		1					1	71	100	89
1BD	3	196	12	10	1			2		1	2	228	99	86
1BF		34	1					1				35	100	97
1BG	1	269	12	7		1	1				1	293	100	92
1BH	3	431	16	4	3			2			2	465	99	93
2JA	2,868	1,758	291	216	92	52	46	28	14	1	69	5,445	47	32
2JB	1,503	78	27	34	20	16	17	13	9	10	54	1,781	16	4
2JC	59	4	2	2		1		1			1	71	17	6
2JE	3,072	589	75	48	35	40	37	35	29	12	66	4,038	24	15
2KA	674	651	74	26	22	17	7	5	3	3	16	1,498	55	44
2KC	32	320	16	10	3	2		3		1	3	390	92	82
2KF		60										60	100	100
2KG	1,655	536	81	71	28	27	22	14	9	7	35	2,485	33	22
2KH	1,136	56	9	12	12	10	11	10	9	2	19	1,286	12	4
2KJ	1,256	393	68	45	23	16	31	12	17	6	27	1,694	34	21
2LA		9		1								10	100	90
2LB		59	4	2	1							66	100	89
2LC	872	1,818	194	111	48	39	32	16	12	8	36	3,186	73	57
2LD	252	762	80	37	12	15	8	5	4	4	13	1,192	79	64
2LE	1,702	547	110	59	36	29	21	12	8	5	26	2,555	33	21
2LF	267	1,252	79	42	25	17	15	7	4	1	21	1,730	85	72
2LG	5,080	1,222	266	193	92	75	62	40	28	13	88	7,159	29	17
2LH	1,251	1,486	182	134	57	41	26	17	13	6	79	3,292	62	45
2MC	3	45										48	94	
2NA	4,095	569	65	68	44	28	30	23	24	17	79	5,042	19	11
2NB	1,611	76	40	29	23	19	11	8	6	8	19	1,850	13	4
2NC	3,073	137	72	75	53	42	33	18	16	5	54	3,578	14	4
2ND		439	48	35	15	21	6	6	7	2	16	956	54	38
2NE	1,642	661	95	83	48	26	18	9	9	6	34	2,640	38	25
2NF	251	1,522	183	96	75	27	17	19	13	3	46	2,252	89	68
2NG	215	483	39	31	11	6	2	3	2	1	18	811	74	60
2OA		152	2	1								155	100	98
2OB	618	742	58	49	36	11	10	4	3	3	19	1,553	60	48
2OC	165	766	80	47	28	18	11	7	4	6	14	1,146	86	67
2OD	3	38		2								48	94	79
2OE	5	197	12	13	7	2	7	3		1	14	261	98	76
2OF	3	62		2	2	2		1			3	77	96	81
2OG	2	133	1	1					1		5	143	99	93
2OH	2	93	2	2	1	1	2				3	105	98	89
2OJ		53	1		2							56	100	95
2PA	555	1,076	101	76	40	15	21	11	14	4	32	1,945	72	55
2PB	34	626	59	37	16	11	7	7	1	2	9	809	96	77
2PC	29	410	28	30	23	9	5	4	1	2	7	548	95	75

APPENDIX 7

COMPARISON BETWEEN THE RELATIVE ACCURACY
OF DRAINAGE BASIN PLANIMETRY AT 1:1 MILLION AND 1:2 MILLION

Three drainage basin sub-subdivisions which occur both in the Land Cover data base (1:2 Million) and in the CDR Model data base (1:1 Million) are compared in terms of planimetry accuracy. For each of the three drainage basins, the one on the left page corresponds to the 1:2 Million data base; the one on the right hand page corresponds to the 1:1 Million data base. The three randomly selected drainage basins are: 2RB, 2RG, 2OB, located in Southeastern Quebec. In all cases, the area is given in hectares, and all the measurements carry a precision of two decimals (0.01 hectare).

The major differences in accuracy between the two data bases lies in the general drainage basin outline and in the water planimetry. The watershed line (or drainage divide) which defines each drainage basin is more detailed at the 1:1 Million scale than at the 1:2 Million scale. Therefore, the accuracy is greater at the 1:1 Million scale. In addition, the more detailed 1:1 Million scale allows for a lower detection limit for water bodies (lakes and rivers). As a result, the water area is usually greater at the 1:1 Million scale than at the 1:2 Million scale because more water is detected. Still, the 1:1 Million scale only allows for so much resolution for water, so that a larger scale (below 1:1 Million) will detect even more water bodies.

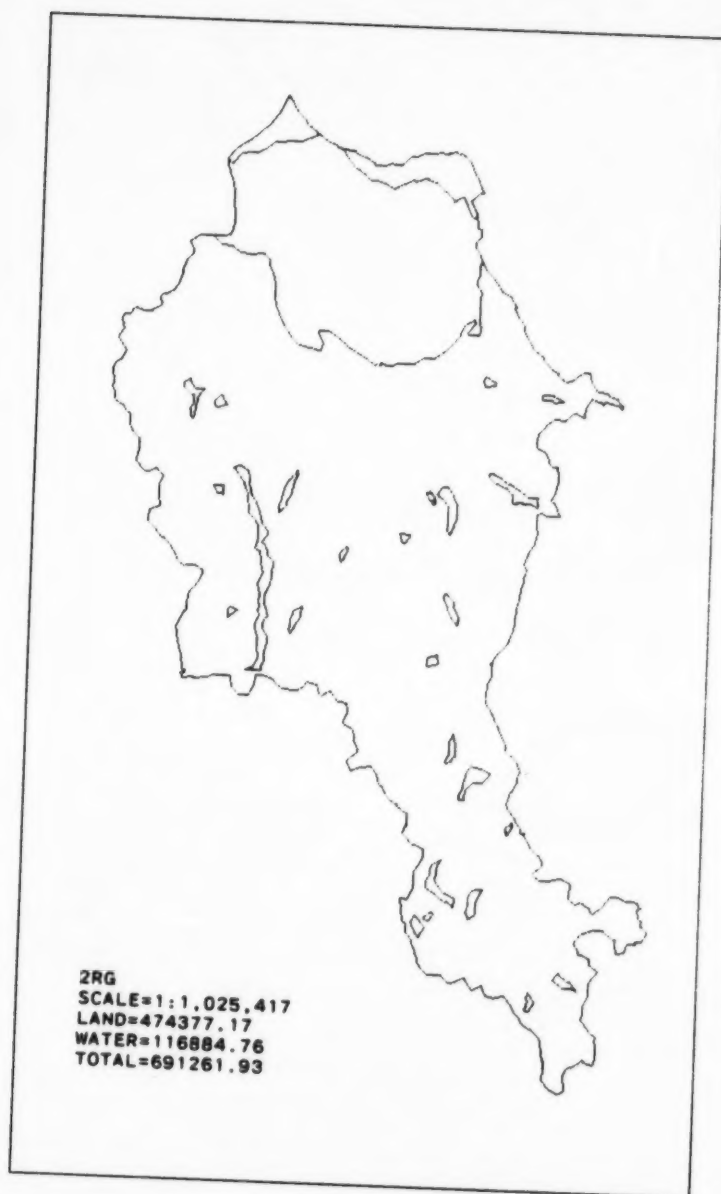
2RB
SCALE=1:1,670,786
LAND=456005.04
WATER=3519.40
TOTAL=459524.44







2RG
SCALE=1:1,367,004
LAND=489310.55
WATER=93580.37
TOTAL=582890.92





208
SCALE=1:1,063,223
LAND=535332.74
WATER=5245.6
TOTAL=540578.34

